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Trade Routes and Trade Potential

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Pradeep Agrawal is Professor and Head, RBI Unit, Institute of Economic Growth, New Delhi

email: pradeep@iegindia.org

Seema Sangita is Associate Fellow, National Council of Applied Economic Research, New Delhi

email: seema.sangita@gmail.com

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ABSTRACT

In an environment of increasing importance of South–South bilateral trade partnerships, we assess the potential for improving bilateral trade between India and five Central Asian countries in this paper, and construct a trade potential index. We find huge untapped potential for increasing trade, and that India and Central Asia would benefit from policies that encourage trade, including bilateral and regional trade agreements. One of the constraints of trade is a political problem in the countries that fall in the trade route. Hence, we explore the possibility of alternative routes and find that trade via Iran could be viable.

Keywords: India, Central Asia, trade, gravity model, trade potential, trade routes

JEL Classification: F10, F14

1 INTRODUCTION

Given the prolonged recession in Europe and the USA, South–South bilateral trading relationships are gaining importance, and nations would be prudent to diversify trading partners and increase trading opportunities with emerging market economies. The problem of how to improve bilateral trade between any two nations is neither merely economic nor bilateral but entwined with the geopolitical relationships in the entire region in question. Trade between India and Central Asia is hindered by regional politics that involves countries such as Afghanistan and Pakistan. In this context, this paper assesses the potential for increasing trade between India and Central Asian nations using a gravity model of trade framework and attempts to identify feasible alternative trade routes that can bypass politically unstable areas in the region.

Until 1991, the five Central Asian countries—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan—were a part of the United Soviet Socialist Republic (USSR), and the USSR's central planning framework determined their economic activities. When the USSR collapsed in 1991, the Central Asian nations were born, and initially faced a severe economic downturn. The reasons were several: disruption in the production network with the former USSR; loss of subsidies from the former USSR; inexperienced private sector; insufficient infrastructure; and lack of institutions for a market economy, including well-functioning capital and labour markets (also see Dowling and Wignaraja 2006a). The manufacturing sector experienced a severe breakdown of supply of raw materials and lack of markets. Now much smaller both in terms of geography and economy, Central Asian countries were forced to create foreign trade ties with other countries since self-sufficiency in production of goods and services, which was established in the USSR, had collapsed. As the economies became more market-oriented and many industries were privatised, these nations stepped into the globalised world. Coincidentally, India too initiated its economic liberalisation and globalisation policies in 1991. While there have been differences and similarities in the growth experience of these countries since 1991, the global recession has affected all these countries since 2008. One of the ways of coping with recession in the west is creating diverse trade and investment partners and to develop stronger South–South ties. Therefore, this paper examines the current trade and business relationship between Central Asian countries and India and identifies potential for improvement.

India adopted structural reforms, including liberalisation policies, in 1991. Its planning-oriented economy entered a period of transition to a much more market-oriented open economy. India and Central Asia faced one common challenge in 1991—how to integrate into the world economy? Each country, however, had a different set of resources and different economic circumstances and had different degrees of success in meeting this challenge.

Although India's proximity to Central Asian countries is offset by its unfavourable political relationship with Pakistan, trade in goods between India and Central Asia has increased manifold over the past decade. Nevertheless, Central Asia's exports to India averaged only about 1 per cent of their total exports and did not exceed 2 per cent for any of the five countries (Figure 4). Also, imports by Central Asian countries from India remain small (Section 3). In fact, India does not feature in the list of key trading partners in any of the five Central Asian countries. A good trade relationship with Central Asian countries is of high strategic importance for India, since these countries are sandwiched between major powers like Russia, China, and Europe, and have enormous amounts of energy resources, which could help meet India's energy requirements and sustain its high economic growth. Given the volatile global economy, there is great need to forge trade relationships with a range of developing countries. Also, several major and regional powers (including western countries) consider a strategic relationship with Central Asian countries important, due to their location at the crossroads of Eurasia. Cooperation is essential to maintain peace and harmony in the region and avoid terrorism and illegal activities, so that mutually beneficial economic trade and investment ties can be promoted (Rakhimov 2010).

In the following section (Section 2), we discuss the economies of the five Central Asian nations and India in depth—since economic growth is possibly the most critical factor for any nation in increasing international trade—and analyse the patterns of bilateral trade between India and Central Asia including commodity level trade patterns. In Section 3, we present the gravity model framework; we discuss the empirical strategy to derive the trade potential index using this model, and present the results. In Section 4, we discuss alternative trading routes to circumvent political disturbances. Finally, in Section 5, we present our concluding remarks.

2 THE ECONOMY AND TRADING PATTERNS OF CENTRAL ASIAN COUNTRIES AND INDIA

To provide a background for the analysis of trade potential between the countries under study, we discuss their historical growth patterns and the current state of their economies (Sub-section 2.1). We also study the aggregated trends in bilateral trade and identify some key commodities traded between India and each of the Central Asian nations (Sub-section 2.2).

2.1 Growth Patterns in Central Asia and India

The economic growth of both the exporter and the importer country is essential for expansion of international trade. A country that has a higher GDP has the ability to produce more and hence export more. Also, a country with a higher GDP has greater ability to consume and,

hence, import more. International trade also feeds into the economic growth of nations as it enables improvements in productivity and specialisation.

In the first half of the 1990s, economic growth declined sharply and even became negative in Central Asian countries as they were dealing with the aftermath of the USSR's dissolution. When these countries were a part of the USSR, their role was mostly to supply raw materials and energy to the USSR economy; for example, Hiro (2010) discusses how Uzbekistan had a 'cotton monoculture'—it produced cotton, but had no textile industries. It processed barely 15 per cent of the total cotton output.[1] Most manufacturing industries were located elsewhere. This region never developed an independent industrial sector or managerial skills. International trade was planned and executed in Moscow (Dowling and Wignaraja 2006b). Therefore, after the USSR collapsed, the self-sufficiency of Central Asian economies disappeared and the supply chains of consumption goods and raw materials were destroyed. Even from a geographic perspective, these countries were landlocked and isolated from trading routes. The lack of access to resources resulted in increasing poverty, making it even more difficult for the economies to focus on industrial growth.

The growth rates of the economies were mostly negative due to the collapse of existing economic relations. However, a turnaround happened towards the end of the 1990s, and most Central Asian economies moved into a positive economic growth trajectory. Since then, the five economies have evolved in different ways, but the growth rate of GDP has been quite high. Further, all the economies have experienced structural changes with an expansion of the services sector and a relative decline in the agriculture sector.

Table 1 compares the average annual growth rate of the Central Asian economies across the decades of 1991–2000 and 2001–2011.

**Table 1** Average GDP growth rate (%)

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	India
1991-1999	-4.8	-4.4	-10.2	-2.6	-0.5	5.8
2000-2009	8.6	4.7	9.0	7.4	6.5	6.9
2010-2012	6.6	1.5	7.3	11.7	8.3	6.7

Source: World Bank (2012)

There is a dramatic turnaround of the average annual growth rate in every country of Central Asia, from negative in the 1990s to positive in the following decade. Further, the magnitude is high, except in the case of Kyrgyzstan which experienced a political crisis—the Tulip Revolution—in 2005.

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[1] Hiro (2010), p 139.

Figure 1 GDP per capita of India and Central Asian countries
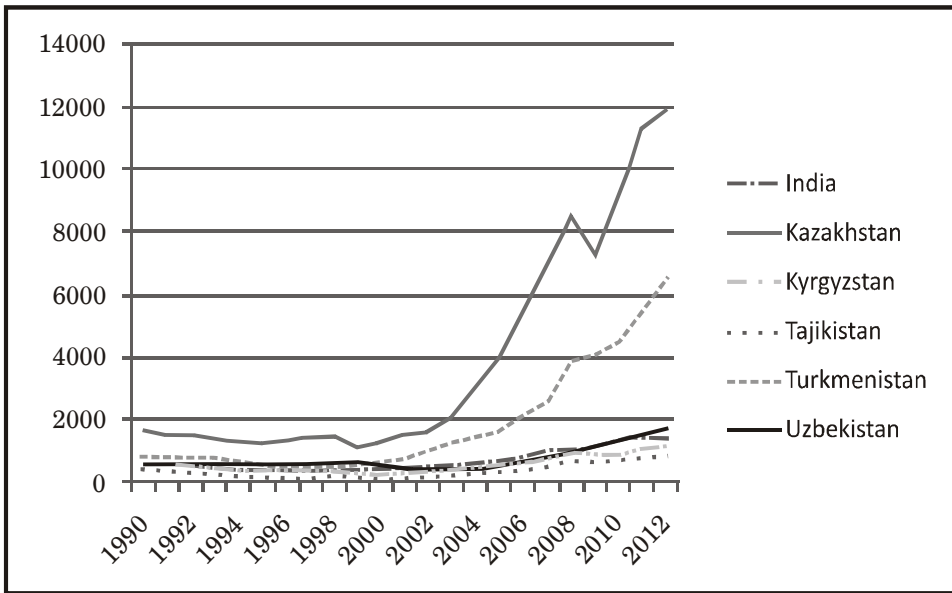
Kazakhstan has had the highest GDP per capita in the region, as demonstrated in Figure 1. The Kazakh economy switched from a negative growth to a positive and sustained growth in 1998 (Agrawal 2008). It also has the largest geographical area and a relatively small population. (Table 2 compares the population and land area statistics for Central Asia and India). Kazakhstan is rich in oil and uranium and has a strong agriculture sector. As observed in Table 1, its average annual growth rate between 2000and 2009was high (8.6 per cent). In contrast, Kyrgyzstan is the least developed country—its GDP grew 4.7 per cent on average between 2000 and 2009, much slower than the 6.5–9 per cent rate in other countries. The average annual growth rate has declined over 2010–2012 in Kazakhstan (6.6 per cent) and Kyrgyzstan (1.5 per cent).

Tajikistan is the other relatively poor country in this region. Although its growth rate has been increasing, its GDP per capita was the lowest among the five Central Asian countries (Figure 1). Its average growth rate grew from -10.2 per cent over 1991–1999 to 9 per cent over 2000–2009, primarily due to a very high growth rate of more than 20 per cent in 2006 and 2007. After 2007, however, the oil price shock and global recession affected Tajikistan, the smallest nation in terms of geographical area. It has a relatively higher population and the highest population density in this region apart from Uzbekistan. The per capita GDP

has consistently remained low here, and its average annual growth rate has declined by about 1.5 percentage points in the years 2010-2012 compared to the previous decade, possibly because of the global slowdown.

Turkmenistan is the second most developed economy after Kazakhstan in the region. The average annual GDP growth rate over 2000-2009 was 7.4 per cent. The GDP per capita (about US $5500 in 2011) of Turkmenistan is five times higher than that of Tajikistan and Kyrgyzstan (Figure 1). Turkmenistan has a relatively low population density. The country is large (Table 2), but mostly desert. While the GDP per capita fell in 2008 after the oil price shock, the magnitude of the fall was not as much as the rest of the region.

Table 2 Population and land area

Country	Population (2011)	Land Area (sq km)	Population Density (population per sq km)
Kazakhstan	16,558,676	2,699,700	6.13
Kyrgyzstan	5,514,600	191,800	28.75
Tajikistan	6,976,958	139,960	49.85
Turkmenistan	5,105,301	469,930	10.86
Uzbekistan	29,341,200	425,400	68.97
India	1,241,491,960	2,973,190	417.56

Source: World Bank (2012)

Uzbekistan is the most populous country in Central Asia and also has the most population density (Table 2). Its GDP growth rate has increased steadily since 1991. While Uzbekistan's growth rate averaged -0.5 per cent during 1991–1999 (Table 1), it was the highest among the five Central Asian countries in that decade. The growth rate rose to 6.5 per cent on average in the 2000-2009period. The GDP per capita of Uzbekistan, however, is much lower than that of Kazakhstan or Turkmenistan. While the average annual growth rate declined in other countries after 2010, Turkmenistan and Uzbekistan's growth rates have increased compared to 2000-2009 (Table 1).

The higher international prices of oil benefited Central Asia, but India—which imports large quantities of oil—experienced increased inflation and slowdown in growth. The dissolution of the USSR and disruption in the economies of countries of its member states (including Russia), which were major trading partners of India, also contributed to the trade imbalance. It led to a balance of payments (BoP) crisis in 1990 and prompted the structural reforms policies at the behest of the International Monetary Fund (IMF). Thus, around the

same time the Central Asian nations were created, India adopted liberalisation policies that ended industrial licensing; let the private sector participate in sectors such as telecom, banking, and infrastructure; and opened the economy to foreign trade and investment. In the 1990s, the average growth rate of the Indian economy was around 5.6 per cent; it increased to 7.5 per cent on average over 2001–2012. India also has a large geographical area, which is comparable to Kazakhstan, and a large population (about 1.2 billion in 2012) and a huge supply of manpower. The population density of India is six times as large as Uzbekistan, the most populated country in Central Asia, and about 65 times that of Kazakhstan (Table 2). This reflects the potential of India as a trading partner in labour-intensive commodities and as a market for Central Asia and the world.

India's foreign trade has increased dramatically since economic liberalisation. Between 1992 and 2011, India's imports increased 20 times in value and its exports 16 times. India's primary exports are processed fuels, jewellery, organic chemicals, electrical machinery and equipment, and vehicles. Its primary imports are mineral fuels, gold, machinery and machinery parts, electric machinery, and organic chemicals.

2.2 Evolving Patterns of Trade between India and Central Asia

To forecast the potential of trade between India and Central Asia, we need to understand the patterns of bilateral trade. Therefore, we present the historical evolution of bilateral trade since 2000 and provide an overview of the commodities traded.

Over the past decade or so, the exports and imports of Central Asia have steadily increased for most parts. In Kazakhstan, one can observe a rapid increase in the exports between 2003 and 2008, followed by a decline in 2009 and 2010 (Table 3). The likely cause for this phenomenon is the decline in the crude oil prices in 2009 and the recession in Europe and the USA. Similarly, exports increased in Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan until 2008 but declined subsequently.

The trends in values of exports of Central Asia are heavily driven by prices of commodities in the international market. The export performance of Kazakhstan was driven by favourable energy prices (Pomfret 2005). In the case of Uzbekistan, world cotton prices increased until 1996 and dropped since then, and this correlates with the value of exports from the country. 'Turkmenistan's exports are dominated by energy products and the 1995–1996 values are inflated by over-reporting of natural gas exports to CIS destinations which were not paid for (the invoice value was recorded as exports, while the accumulating payment arrears were recorded as foreign assets); recognising that the bills would never be paid in full, Turkmenistan stopped supplying gas in March 1997, after which export values (and GDP) collapsed until the flow was resumed in March 1999' (Pomfret 2005).

Imports have increased steadily in contrast, including after 2008 (Table 4). The only exception in this case is Kazakhstan, where the imports rise consistently till 2008 and fall

thereafter. In 2008, the imports of Kazakhstan were at its peak at USD 37.80 billion, and this declined by about 40 per cent to USD 21.4 billion by 2011.

Table 3 Total exports of Central Asian Countries and India (billion US$)

| Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	India
2000	9.88	0.50	0.77	2.51	2.18	42.63
2001	9.09	0.48	0.65	2.56	2.09	43.32
2002	9.67	0.49	0.74	2.82	1.55	50.52
2003	12.93	0.58	0.80	3.45	2.02	61.13
2004	19.94	0.71	0.91	3.53	2.74	75.39
2005	27.69	0.63	0.91	4.95	3.61	98.21
2006	38.01	0.80	1.40	5.64	5.25	120.55
2007	46.98	1.13	1.47	6.30	6.29	153.78
2008	71.17	1.62	1.44	10.14	7.48	177.70
2009	43.19	0.90	1.01	3.08	4.77	165.19
2010	57.24	1.05	1.19	3.23	5.55	222.93
2011	80.19	1.14	1.00	7.59	5.59	307.11

Source: IMF 2013

Table 4 Total imports of Central Asian Countries and India (billion US $)

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	India
2000	5.05	0.55	0.67	1.79	2.07	50.34
2001	6.48	0.47	0.69	2.21	2.29	50.14
2002	6.58	0.59	0.72	2.13	2.08	58.91
2003	8.41	0.72	0.88	2.51	2.48	74.08
2004	12.64	0.94	1.19	2.68	3.16	99.84
2005	17.47	1.11	1.33	2.61	3.57	139.89
2006	23.70	1.71	1.73	2.53	4.48	176.67
2007	32.60	2.42	2.54	3.36	7.02	235.03
2008	37.80	4.07	3.25	5.46	10.11	281.47
2009	28.36	8.22	2.51	6.54	9.04	257.67
2010	24.02	7.23	2.66	5.64	9.26	350.78
2011	21.42	9.08	4.77	7.68	10.75	465.13

Source: IMF 2013

Of the five Central Asian countries, India has had the most trade with Kazakhstan, which is also the largest economy in Central Asia. Kazakhstan's exports to India rose sharply after 2005 (Figure 2). In 2011-12, the total exports of Kazakhstan to India stood at US$166 million. Uzbekistan is a distant second at a little over US$60 million. The other nations of Central Asia have exported commodities valued at less than US$20 million for most parts of the last decade (Figure 2).
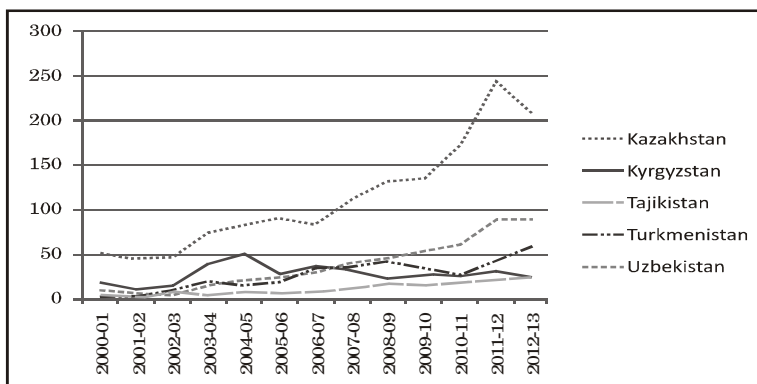
Figure 2 India's imports from Central Asian Countries/Central Asia's exports to India (million US$)
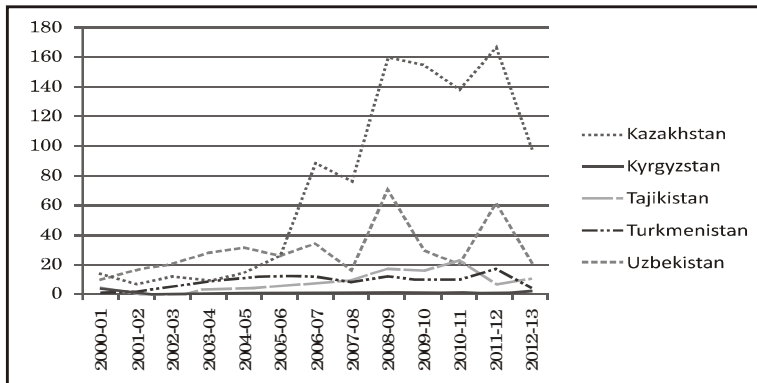
Source: Ministry of Commerce, Government of India (2013)

The value of Kazakhstan's imports from India has been consistently increasing from USD 50 million in 2000-01 to about USD 250 million in 2011-12 (Figure 3). Uzbekistan's imports have also been increasing, but the rise is not as sharp as that of Kazakhstan. The rest of the Central Asian countries have not observed much of an increase, but in general, the imports of Central Asia from India are higher than the corresponding exports (Figure 3).

Figure 3 India's exports to Central Asia/Central Asia's imports from India (million US$)

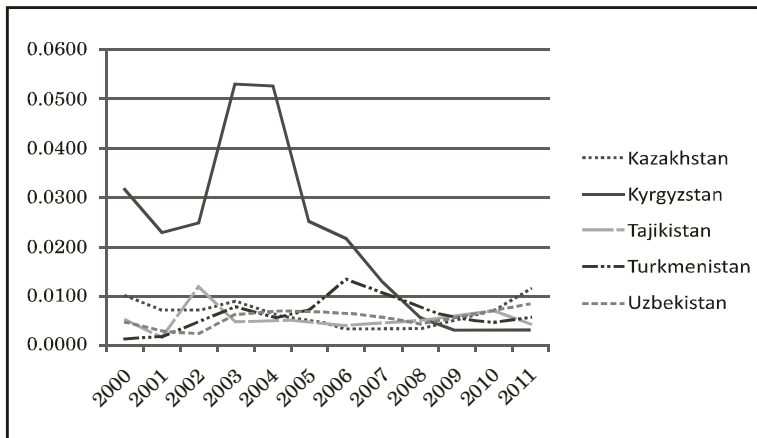*Source:* Ministry of Commerce, Government of India (2013)

Despite the increasing trade levels over the last decade, the share of Central Asian countries' trade with India, relative to their trade with the rest of the world, remains very low (Figures 4 and 5).

Figure 4 Share of Central Asia's exports going to India
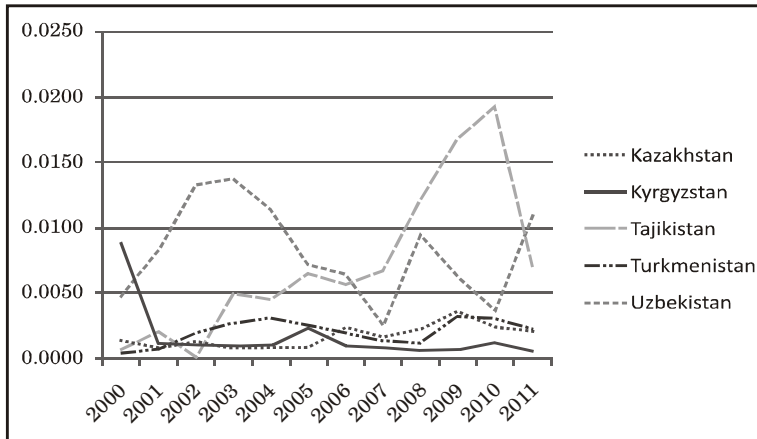
Figure 5 Share of Central Asia's imports coming from India

The share of Tajikistan and Uzbekistan's exports to India is less than 2 per cent and that of the rest of the countries is less than 0.5 per cent. The share of all the countries' imports from India is less than 1.5 per cent; the only exception is of Kyrgyzstan in 2003 and 2004. However, in the case of Kazakhstan, there is a declining trend of total exports with

the rest of the world, but an increasing amount of bilateral exports to India. This is a good sign of the increasing importance of Kazakhstan's trade with India. We should work towards a similar improvement in bilateral trade between India and the rest of Central Asia.

The popular exports of Central Asian countries to India are precious and semi-precious stones and jewellery (mostly unwrought and semi-processed silver). The other commodities that are purchased by India are in the categories of chemicals, iron and steel, machineries, mineral oils, copper goods, plastic goods, wool, and leather (Table 5).

Table 5 Central Asia's major exports to India (million US$)

HS Code	Commodity	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
	Total	**166.35**	**0.67**	**7.09**	**16.89**	**61.58**
71	Pearls, stones, jewellery	48.48				29.62
28	Chemicals, precious metals, rare-earth metals.	11.22	0.29		11.11	
72	Iron and steel	5.31	0.08			0.11
84	Machinery and mechanical appliances	1.95	0.03	0.15	0.07	1.87
27	Mineral oils, etc.	1.08		0.12		3.45
74	Copper goods	0.75				0.7
39	Plastic goods	0.5	0.09		0.04	0.48
85	Electrical machinery and equipment	0.36		0	0.01	0.38
51	Wool and woven	fabric	0.21	0.04	0	0.68
41	Raw hides and leather	0.16	0.09		0.11	0.44

Source: Ministry of Commerce, Government of India (2013)

The main commodities that are imported by Central Asia from India include coffee, tea and spices; pharmaceutical products; electrical and mechanical equipment (Table 6).

Table 6 Central Asia's Major Imports from India(million US$)

HS Code	Commodity	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
	Total	**244.39**	**30.55**	**21.28**	**43.95**	**61.58**
9	Coffee, tea, and spices	54.50	1.75	0.37		
30	Pharmaceutical products	43.81	5.65	8.14	11.35	
85	Electrical machinery and equipment	39.44	1.80	0.14	4.10	0.38
61	Apparel (knitted)	34.83	9.42	3.54	0.05	0.01
62	Apparel (not knitted)	19.05	6.29	0.33	3.45	
84	Machinery and mechanical appliances	7.24	0.13	1.40	13.08	1.87
87	Vehicles	6.95			0.05	
69	Ceramic products	3.88			0.28	0.01
27	Mineral oils, etc	1.94			2.34	3.45
2	Meat	1.02	1.59	4.67	2.74	

Source: Ministry of Commerce, Government of India (2013)

Almost every country in Central Asia imports apparel and clothing (both knitted and not knitted) and processed meat products from India, along with vehicles, ceramic products, and mineral oils.

India is an emerging market country in the process of industrialisation and Central Asia is rich in minerals and raw materials. At the same time, Central Asian countries are small economies, and they depend on foreign trade for meeting many of their needs. This situation leads to a huge potential in trade between India and Central Asia.

On the whole, exports from India to Central Asian countries are rather low in magnitude. This, however, is an opportunity for India to develop its trade relations and increase its

exports to the region. Pharmaceutical industry exports seem to dominate the scene when it comes to the major products that flow from India to Central Asia. Since a market for Indian medicines and vaccines has been established, this market can be deepened further. Another product of India that appears to be popular in the Central Asian markets is frozen and processed meat. Manufacturing of vehicles and their parts is emerging as a significant sector in India. However, Uzbekistan is the only country that imports vehicles or their parts. This signals a huge potential for expanding India's exports in the automobile sector to the other four nations of Central Asia. India's major imports from Central Asia are various metals, minerals, and other raw materials. Some examples are gold, silver, lead, zinc, mercury, and aluminium. These imports are essential to sustain the Indian manufacturing sector. There are also some imports of machineries and agricultural goods; however, there is scope to expand this trade.

The textiles industry could be a tremendous opportunity for India and Central Asian countries. India imports fabrics of various kinds from Central Asia, such as raw cotton fibre, wool of different kinds, raw silk, etc. India also imports machinery for textile processing such as machines for spinning and knitting. In turn, India exports finished goods such as T-shirts, blouses, baby's garments etc. made of cotton, dresses made of synthetic fibre, etc. Central Asia has been a major producer of cotton since the Soviet era. Processing the raw cotton and other fibres into fabric and clothes is, relatively, a labour-intensive industry and is suitable for the demographic structure of India. Hence, there is a huge potential in strengthening this industry for mutual benefit from both perspectives.

3 TRADE POTENTIAL BETWEEN INDIA AND CENTRAL ASIA: AN ANALYSIS USING THE GRAVITY MODEL

This section briefly describes the gravity model of trade—which is used to understand bilateral trade between India and Central Asia—and its relevance to this research study and uses the gravity model to create the trade potential index.

3.1 The Gravity Model Framework

The gravity model is a simple model that has been extensively used to study bilateral trade patterns and determinants (see Bergstrand and Egger, 2011, for a detailed survey of the use of gravity model in bilateral trade studies).In its simple form, the gravity model suggests that bilateral trade between two countries is directly proportional to the GDP of both the nations and inversely proportional to the distance between them. If the two countries are i and j, then gravity model can be represented as

$$Trade_{ij} = \alpha GDP_i^{\beta_1} GDP_j^{\beta_2} / Dis \tan ce_{ij}^{\beta_3} \qquad\qquad (1)$$

As elaborated by Bergstrand and Egger (2011), this equation explains bilateral trade flows reasonably well. This model has received theoretical backing by different research papers, including Anderson and Van Wincoop (2003).

The GDPs of the two countries represent the size of the economies that indulge in bilateral trade. In the country of export, the GDP reflects the output of the economy and acts as a proxy for the production capabilities. In contrast, GDP represents the income in the importing country. It denotes the size of the market for commodities—countries with a higher GDP are likely to have a greater demand for goods in the international market.

Although advancements in communications and transportation technologies have facilitated international trade, several factors still inhibit it. Cost of transportation is an obvious barrier. The variable 'distance' is a proxy for cost of transportation. There may be several more frictions, notably tariff and non-tariff barriers to trade. Further frictions to trade may be caused by national or international policies that vary across geography and time—Bergstrand and Egger (2011) call these 'unnatural' or 'man-made' costs of trade. Some of these policies may directly influence trade (subsidies to industries, for example) and some may support trade indirectly (such as policies towards creating adequate infrastructure for transportation). Also, there may be other forms of price rigidities that are idiosyncratic to particular countries. We include fixed effects in the gravity model to capture the effects of some of these trade frictions.

3.2 Analysis of Trade Potential using the Gravity Model

This paper contributes to a small and emerging literature on the analysis of trade potentials. The methodology of this paper is similar to that of Kabir and Salim (2011), which attempts to understand the potential for economic integration between the European Union (EU) and the Association for South East Asian Nations (ASEAN). In their paper, Kabir and Salim analyse the level of trade integration between ASEAN and EU and assess the untapped trade potential. They suggest that the 'projected potential trade is the amount of trade that can be achieved by ASEAN if they can achieve the level of regional trade integration as [achieved by] EU'. They use the coefficients of a gravity model of intra-EU trade to generate a benchmark against which potential trade is estimated. They calculate the 'undiscovered trade potential', which is a ratio of the trade potential and actual trade, and find substantial undiscovered trade potential in the case of the ASEAN and EU.

Batra (2004) uses the gravity model to estimate India's trade potential. He uses global trade flows to estimate the benchmark against which India's trade potential is measured.

He aims to find the trading partner country/region with which India has the maximum trading potential, and finds that India has the maximum trading potential with the Asia-Pacific region and with China at a country level. In his analysis, he also demonstrates that India has the potential of increasing trade with Turkmenistan, Uzbekistan, and Tajikistan by about 10 times. However, the study uses a cross-sectional analysis that does not reveal the direction of change in trade potential. Finally, another paper that uses the gravity model to predict bilateral trade and assess trade potential for Hungary, Poland, and the Czech Republic is Jakab et al (2001). They find that (in 1997) Poland and the Czech Republic had positive trade potential and demonstrate that the direction of trade had changed from east to west in the case of Hungary and Poland. They highlight the importance of analysing the dynamics of actual and potential trade, rather than their point estimates, for accurate results.

In this paper, we use a strategy that is similar to this literature. A gravity model analysis is undertaken for India's bilateral trade with the rest of the world between 1996 and 2012 to derive our benchmark estimates. We use the log linear version of the gravity model to derive our estimation equation, as shown below:

$$InTrade_{ijt} = \alpha + \beta_1 InGDP_{it} + \beta_2 InGDP_{jt} + \beta_3 InDis \tan ce_{ij} + \varepsilon_{ijt} \qquad (2)$$

In our case the country i is India and country j consists of more than 180 countries. The main hypothesis of this model is that β_1 and β_2 would be positive and the coefficient of distance, β_3, would be negative.

The data on bilateral trade has been taken from the Ministry of Commerce and Industry, Government of India. The variable 'trade' consists of the sum total of the value bilateral exports and imports of India with its trading partner in each year.

The GDP data has been sourced from the World Bank's database. The distance and other bilateral control variables are from the CEPII's gravity dataset.[2] The distance variable is the distance between two countries in kilometres, weighted by the geographic distribution of population in the countries.

To test the robustness of this model, we extend it by including two control variables—common official language and physical contiguity. Common official language enables easier medium for communication regarding the terms and conditions of a trade deal and execution of the transactions. Contiguous countries are more likely to trade with each other. These countries share a border and the traded commodity usually needs to be transported over shorter distances by road. This reduces the transaction costs of crossing multiple borders or

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[2] CEPII is French Research Center in International Economics: http://www.cepii.fr/CEPII/en/cepii/cepii.asp

shipping. Thus, we hypothesise that common language and contiguity would have a positive and significant effect on bilateral trade. However, in the case of India, there is an important exception. India does share a major border with Pakistan; however, cross-border trade is minimal due to political issues. Hence, we do not include bilateral trade between India and Pakistan in the sample in this extended gravity model.

We undertake time series cross section estimation of the gravity model and the extended gravity model using data for India's trade with over 180 partner countries using ordinary least squares (OLS) estimation. As we expect the variable 'distance' not to capture all the trade frictions between countries, we include partner country fixed effects, which capture effects of different trade policies (including tariffs, quotas etc.) and other peculiarities of different trading partners. We also include time fixed effects for each year to control for any special events affecting trade in different years.

We find that the coefficients of the GDPs of both India and the partner countries and the distance between them are consistent with our hypotheses; that is, the coefficient of the GDPs of India and trading partner country are both positive and significant at 1 per cent level, while the coefficient of distance is negative and significant at 1 per cent level. The regression results for Model 1 of Table 7 show that an increase in India's GDP by 1 per cent would increase bilateral trade of India with the rest of the world by 1.2 per cent. Increase in the GDP of the trading partner by a corresponding amount would increase the bilateral trade by 0.7 per cent. When the distance between the two countries increases, trade falls substantially. An increase in the distance by 1 per cent tends to reduce trade by 2.3 per cent. In model 2 also, after inclusion of additional variables, we find that the basic hypotheses of the gravity model holds true. Additionally, we find that common official language and contiguity are positive and statistically significant.

The gravity model presented in column 1 is used as our benchmark to estimate *potential trade*, against which we compare the actual bilateral trade between India and Central Asian countries. The potential trade between India and any other trade partner country in a particular year can be estimated using this model utilising information about the GDP of India and the partner country in that year and the distance between the two countries.

The results of basic model are shown in column 1 of Table 7, while results for the extended model with control variables are shown in column 2.

Table 7 Gravity model for India: panel data estimation of total merchandise trade between India and its trading partners

Explanatory Variable	Model 1	Model 2
GDP (India)	1.226	1.227
	(0.064)***	(0.064)***
GDP (Partner Country)	0.784	0.784
	(0.056)***	(0.056)***
Distance	-2.321	-2.068
	(0.130)***	(0.164)***
Common Lang.		3.177
		(0.582)***
Contiguity		0.937
		(0.285)***
Constant	-28.381	-30.866
	(1.638)***	(1.873)***
R^2	0.95	0.95
No. Observations	2,785	2,768

Notes: 1. All variables are in logs (see Equation 2)

2. ***, ** and * indicate significance at 1 per cent, 5 per cent, and 10 per cent significance levels.

3. Country and Time fixed effects were included, though their coefficients are not reported here.

This estimated potential trade between countries can be used to create a trade potential index which is the ratio between the predicted trade and the actual trade at time t.

(Trade Potential Index)$_t$ = (Predicted total trade from the Model)$_t$/(Actual bilateral trade)$_t$

Using the above procedure, we first estimate the potential trade between the five Central Asian nations and India from 1996 to 2012. Then (for any given year), by dividing the estimated potential trade between any two countries by the actual trade between them for the same year, we can calculate the trade potential index between them for each year.

If the trade potential index is at 1, then the actual trade is exactly equal to the estimated potential trade given the GDP of India and of the trading partner and the distance between them. If the trade potential index is less than 1, then the actual trade is more than the potential trade estimated from this model. This is particularly true for trade-friendly countries, such as the UAE and the USA, which are also hubs of international trade. Trade is easier with these countries, and other unobserved trade frictions are likely to be lower than in the

case of most developing countries. Finally, if the trade potential index is more than 1, it implies that actual trade is lower than the potential trade expected from the model. This also implies that under the current conditions of the size of the economies and the distance between them, there is a potential to increase bilateral trade between the two countries. We expect this to be more likely the case with other developing countries.

It is essential to keep in mind certain shortcomings of the trade potential index. One is that trade in services, an important aspect of India's exports, is not included in the data. Therefore, this model suggests that as the GDP of India increases, India's bilateral trade with any other country in the world should increase. However, with an increase in GDP there might have been an increase in services trade, which is unfortunately not captured at a bilateral level.

It is also instructive to focus on the direction of change of the index. If the trade potential index is larger than 1 and declining towards 1, then the actual trade is converging towards the potential trade and 'the trade potential is being tapped'. On the other hand, if the trade potential index is increasing, it implies that actual trade is falling short of the trade predicted by the model and the 'the potential for trade is increasing'. In other words, there is a divergence between the actual and potential trade between the two countries. If the trade potential index with a partner country is larger than one and/or increasing, it implies that there are obstacles to trade with the country and has policy implications for governments of both countries to pay attention and resolve any problems affecting trade between them.

3.3 Results and Implications

Using the procedure explained in Section 3.2, we have calculated the trade potential index between India and the five Central Asian countries for the period 1996-2012—the results are plotted in Figure 6.

For most parts of the graph, the trade potential index is much greater than 1. This means that actual trade between India and the Central Asian countries is much lower than expected potential trade between them given their circumstances of distance and GDPs.

Kazakhstan is a country with relatively lower trade potential index than other countries, to some extent because there is already substantial bilateral trade between India and Kazakhstan. Nevertheless, there is still potential to improve its bilateral trade with India. In fact, there is an upward trend in the trade potential index, which implies that there is an increasing gap between the actual and prospective trade. Kyrgyzstan has a lower trade potential index than Tajikistan, Turkmenistan, and Uzbekistan, but the untapped trade potential between India and Kyrgyzstan has been increasing since 2004. The trade potential index was rather high for Tajikistan, Turkmenistan, and Uzbekistan in 1996, but there was

a trend of convergence between the actual and potential trade until about 2003. Since then, however, there has been a divergence between predicted and actual trade.

Figure 6 Trade potential Index between India and Central Asian countries
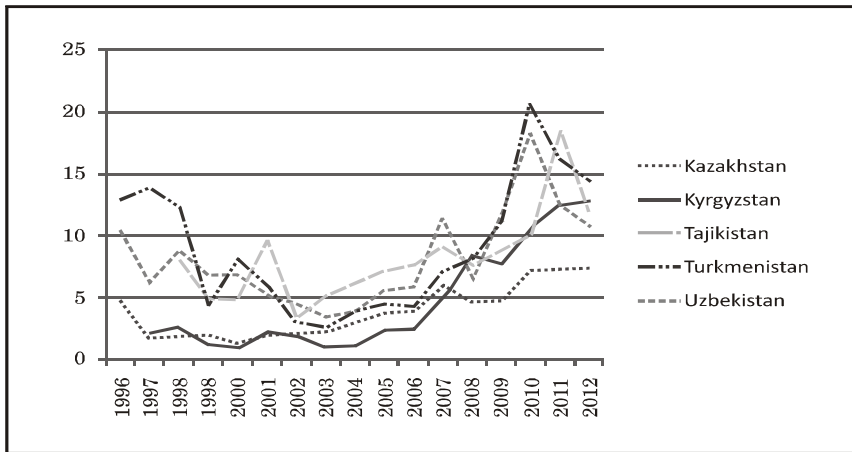
Broadly, we find that the trade potential index has been increasing since 2002–03. Actual trade has increased in this time frame, but much lower than the potential predicted by this model. The main implication of this result is that the GDPs of India and Central Asian countries increased rapidly in this time frame (as evidenced by the growth rate). However, the bilateral trade between India and Central Asia has not kept up. There has also been an increase in trade frictions—the political problems in Afghanistan started around this time and the war has caused instability in the region. India's relationship with Pakistan continues to be tense, and this has caused hurdles in finding the most efficient trade route between India and Central Asian region.

Also, for all countries except Kazakhstan, there is a decline in the trade potential index after 2010 or 2011. In the case of Kazakhstan, the index is stable, showing an end to the increasing trend. This signals an increase in the value of bilateral trade in this time frame, and could signal the start of a phase of convergence between the actual and predicted trade between India and Central Asia. However, as the magnitude of the trade potential index is still substantially greater than 1, there is still potential to improve bilateral trade between India and this region.

4 FEASIBILITY OF ALTERNATIVE ROUTES

Distance between trade partners addresses some of the trade frictions. As we expect the variable 'distance' not to capture all the trade frictions, we have country fixed effects,

which capture other resistances to trade caused by trade policies and other peculiarities of each trade partner country.

In general, Central Asian countries are landlocked and have a challenging topography, which hinders trade in this region (Asian Development Bank 2006). However, the problem of trade frictions between India and Central Asia is peculiar. The distance variable tacitly implies that trade can easily take place through the shortest trade route via Afghanistan and Pakistan. But that is not the ground reality due to political reasons. Note that the fixed effects model would capture any existing political disturbance in India or any Central Asian country. In this case, the disturbances lie in other countries on the trade route. This is not directly captured in the model. Some of the frictions to trade between India and Central Asia are the political turmoil and security problems in Afghanistan and an adverse political relationship between India and Pakistan. This does not enable trade via the shortest routes through these countries. This leads us to the question: What happens to the trade potential if the shortest trade route is infeasible?

Given this situation, we consider two optional routes for trade between India and Central Asia: (1) via Iran and (2) via China. In fact, trade via Iran has been under discussion for some years now. Balooch (2009) explores the possibilities of increased trade after the 'North–South corridor' connecting India and Central Asia is created. While the options of trade via Iran or China have their own international relations problems for India and Central Asia, it would be instructive to understand the implication of these options from an economic standpoint.

This circumstance also highlights one drawback of the usual empirical methodology of gravity models that tend to incorporate the geographical distance between two countries in the model as opposed to the actual cost of transportation of the traded goods. There is a lack of data on the actual distance of trade route for different commodities. This may vary depending on the mode of transportation used (air, sea, roads, railways or a combination of these). Even for a particular mode of transport, different features of commodities may also create a situation of different cost of transportation for identical origin and destination locations. Given the lack of this information, distance is used as a simple proxy for transportation costs. We further assume that trade via alternate routes is an aggregation of the bilateral country pair distances in each route.

There is a rather sparse literature that analyses the role of distance in international trade. Marimoutou et al. (2009) demonstrates that while distance has a negative effect on trade, the magnitude of the effect of distance decreases as the partner's GDP increases. This idea supports the findings of Fratianni and Kang (2006), which show that the distance elasticity is much lower when the trading partners are OECD members. Neither India nor

the Central Asian countries are very rich economies, and hence distances are likely to matter considerably. There is insufficient research on the role of distance in specific cases, such as ours. We attempt to understand the role of distance, which varies with the alternate trading routes, in the case of bilateral trade between India and Central Asian countries.

We create a trade potential index for the three cases—(1) the actual distance;(2) the distance via Iran; and (3) the distance via China. The actual distance is the distance between each of the Central Asian nations and India as provided in the CEPII dataset. The distance via Iran refers to the sum of distances from each Central Asian country to Iran and from Iran to India. Similarly, the distance via China refers to the sum of distance from each Central Asian country to China and from China to India. Then, a trade potential index can be calculated for each of the three alternative trade routes—(1) via China; (2) via Iran; and (3) via the shortest route through Afghanistan and Pakistan between India and each of the five Central Asian countries. The results are presented in Figure 7.

As expected, the trade potential indices for all three routes show a similar pattern in each bilateral country pair. The increase in the index after about 2000 shows that trade has not kept pace with the increasing GDP of the countries. We find that the potential trade index is very high when the trade takes place via the shortest route (and the potential trade is estimated using the shortest distance), often exceeding 15 around 2010. This suggests a potential for ten-to-fifteen-fold increase in trade between India and Central Asia if political and security problems could be sorted out and trade could be conducted through the shortest route via Afghanistan and Pakistan.

The index drops dramatically when the trade takes place through optional routes (and the potential trade is estimated using the distance involved in these optional routes). The trade potential index for trade via Iran between 2008 and 2013 is often in the range of 2 to 3 for the five bilateral country pairs. This means that potential trade via Iran is about two to three times the current actual trade. Thus, it would be worthwhile to develop the trade route via Iran as this route has positive opportunities and could lead to trade between India and Central Asia increasing two-to-three-fold.

Finally, for the case of trade via China, the index is lower than 1 for all Central Asian countries over 2008-2012. To cite a specific example, the trade potential index for bilateral trade between India and Kazakhstan in the year 2012 was 7.3 through the shortest distance, which dropped to 2 for trade via Iran and to 0.73 for trade via China. This indicates that trade via the China route already exceeds the potential trade via this route and it is not likely to grow much via this route.

Figure 7 Trade potential index between India and the Central Asian countries for optional trade routes via China, Iran, and the shortest route (via Afghanistan and Pakistan)

Kazakhstan

Kyrgyzstan

Tajikistan

Turkmenistan

Uzbekistan
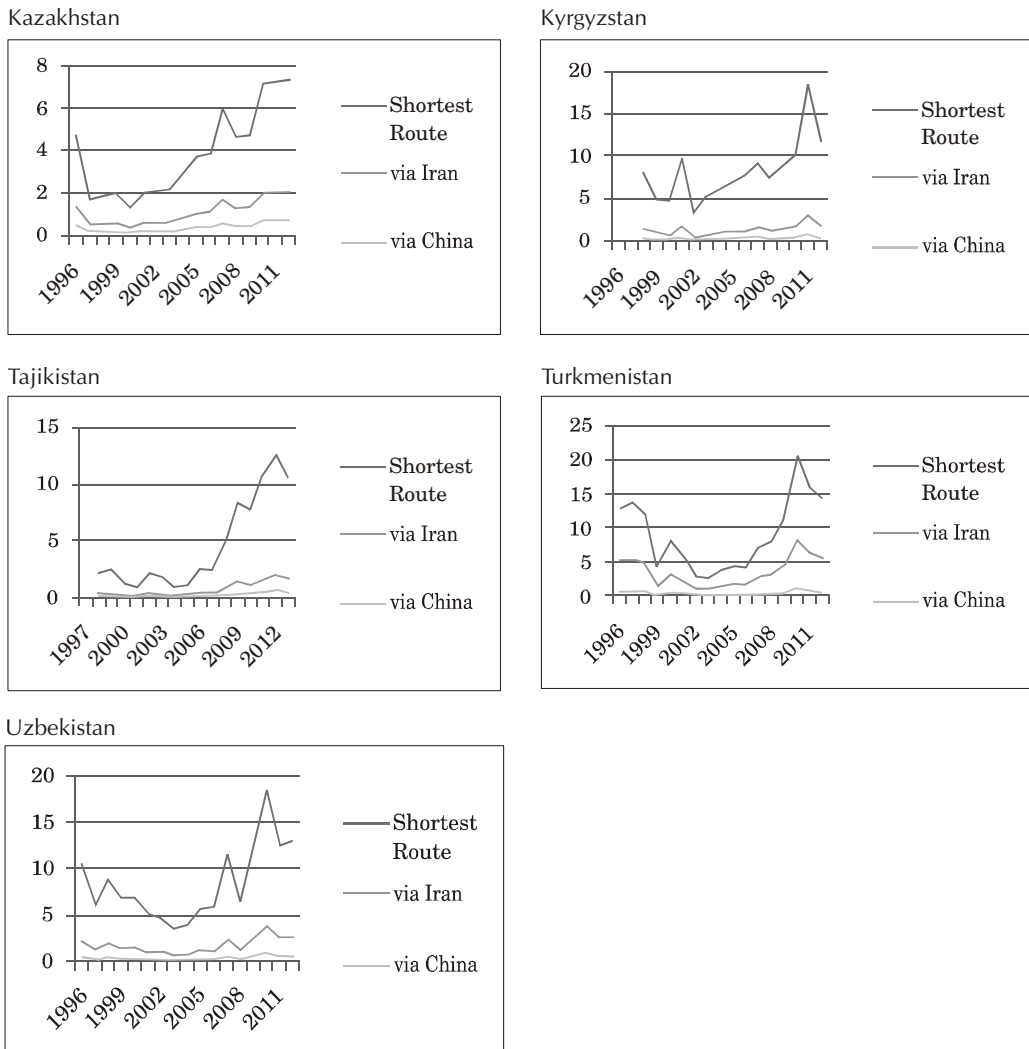
The above analysis explains why the trade between India and Central Asia is so far below its potential. The primary reason is that the distance involved in trading via China is so large that it makes trading difficult, if not impractical. If trade could be conducted through the shortest route via Afghanistan and Pakistan, it would increase about tenfold or more. However, given the political and security problems with these countries, this route may not be practical for the foreseeable future. In this case, full development of the trade route via Iran could lead to India Central Asia trade increasing about two to three fold.

5 CONCLUSIONS AND POLICY IMPLICATIONS

India should encourage trade with Central Asia—a resource-rich and strategically located region—and should welcome bilateral or regional trade agreements to facilitate it. Current trade between India and Central Asia is very low. Our trade potential analysis explains that this is almost entirely because merchandise has to travel very large distances as trade has to be conducted via China or Europe—it is unlikely that trade between India and Central Asia would prosper on these routes. But, if the proposed trade route via Iran becomes operational, trade with Central Asia can be expected to increase about two to three times, as the distance would be significantly shortened. Should the security and political issues in and with Afghanistan and Pakistan be resolved over time, trade with Central Asia could increase to about five to ten times the current levels, as that would dramatically reduce the distances and cost of transporting the goods. However, it is unlikely that the security issues in Afghanistan or political problems with Pakistan will be resolved soon. Therefore, we propose three alternate solutions to enhance trade and economic relations with Central Asia.

One solution could be enhanced trading in high-value, low-volume commodities via air cargo. India could export coffee, tea, spices, frozen meat, and pharmaceutical products. Imports from Central Asia are more challenging, since most of the highly traded commodities are metals, minerals, and oils. Nevertheless, India could import merchandise such as gold, silver and gemstones complementary to the growth of the jewellery industry in India.

Another solution could be to expand FDI ties. Indian firms could set up industries in Central Asian countries that produce commodities for the local market there and vice versa. This idea is particularly feasible in the case of manufactured products, where new factories can be set up in the partner country. The goods would then be sold in the local market directly, bypassing the need for transportation through unreliable routes. India can also participate in oil, gas, and minerals exploration in Central Asia. India's share of the find could be sold to China and European countries and the proceeds used to buy goods closer by. This would solve the problem of transporting India's share of the output of these items to India.

Third, we should consider enhancing trade in services, which largely eliminates the need for physical transportation. A strong, secure internet connection would facilitate BPO services exports. India is progressing as a country that specialises in trade in services and, as a newly industrialising region, Central Asia needs high technology services. Services exports from India, especially of information technology services, have increased steadily since 2000. Also, Kazakhstan's imports of services have been increasing during this period, and services trade in Central Asia will likely increase in the years to come.

To summarise, India's economy has a strong complementarity with the economies of resource-rich Central Asia, and there is a huge potential for enhancing trade and investment relations between them. The trade between India and Central Asia could be ten times as high as it is now if the shortest trade route through Afghanistan and Pakistan were not rendered impassable by the insecurity and political instability there. It is in the interest of India and the Central Asian Countries to try to resolve these problems and to develop alternative trade routes, such as through Iran. It is also desirable to find other avenues for bilateral economic relations, such as trade in services and FDI. With the right policies, it is possible to enhance trade and investment relations between India and Central Asia manifold.

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