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國際學碩士 學位論文

**Empirical Analysis of the Financial Development and the  
Trilemma in Uzbekistan**

우즈베키스탄의 금융발전과정과 트릴레마에 대한  
실증적 분석

2013년 8월

서울대학교 國際大學院  
國際學科 國際通商學專攻  
Ergashev, Botirjon

# Empirical Analysis of the Financial Development and the Trilemma in Uzbekistan

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이 논문을 국제학 석사 학위논문으로 제출함

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by

**Ergashev, Botirjon**

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Seoul National University  
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The Graduate School of International Studies  
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## **ABSTRACT**

A key challenge for all countries with transition economies is how to simultaneously manage exchange rates, interest rates and capital account - trilemma. This paper calculates a trilemma index for Uzbekistan and investigates its evolution over a time. The paper focuses on the analysis of financial reforms considering the implications of changes in the trilemma indices for macroeconomic outcomes of Uzbekistan.

This paper examines reasonability and need for the policies the government of Uzbekistan had to take after 1991. The trilemma indices for Uzbekistan reveal that Uzbekistan failed to establish appropriate monetary and trade policies in the late 1990s, however, is headed in right direction.

**Keywords:** Financial trilemma, Uzbek economy, International reserves, Foreign exchange rates, Monetary policy, Capital control

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## 1. Introduction

Uzbekistan, a major country in Central Asia with the largest population of 30 million people, went through a number of changes on its way towards the market economy after its independence from Soviet Union since 1991. A lot of reforms have been carried out to transform the country from planned economy to market-based economy. The analysis of Uzbek economic transformation and financial infrastructure development has become one of the key areas of research in academia and policy recommendations by many international organizations and scholars as Uzbekistan opened up its economy to trade with other nations and to attract investments from multinational corporations abroad.

In this regard, many scholars factored in their papers various development factors such as natural resource endowment, pre-existing economic infrastructure, historical heritage of the country, world prices for major export products, government regime, as well as development policies the government undertook (Pompret 2000, Ruziev *et al* 2007, Blackmon 2005, Zettelmeyer 1998).

On the one hand, in many cases, Uzbekistan was mostly criticized for data transparency and economic policy implementation by many international researchers (Akimov; The Guardian, 2003; Rosenberg & De Zeeuw, 2001 and others). On the other hand, after 2007-2008 Uzbekistan's macroeconomic achievements were praised in recent decades for producing steady 7-8% GDP growth rate annually (McKinley 2010, Devan 2012; USAID-country profile web-page 2012; Weitz 2012). Furthermore, some scholars even dubbed a new term called "Uzbek Puzzle" in order to describe the situation when Uzbekistan performed relatively well compared to other countries of Former Soviet Union (FSU here after) especially in early 1990s.

This is very odd and only few scholars examined the effectiveness and reasonability of financial policies that Uzbek leadership undertook. Therefore, it is important to examine

transformation policies comprehensively in Uzbekistan where the leadership had to balance between the macroeconomic policy trade-offs that all countries face – financial trilemma – policy trade-offs between interest rates policy (monetary policy) independence, exchange rate stability and financial integration (capital control); whereas a change in one component is associated with a corresponding change in a combination of the other two components. In that sense, the application of trilemma indices in case of Uzbekistan helps us to examine the appropriateness of government policies to regulate and develop the country.

Trilemma indices show us that Uzbekistan was indeed in trouble for tightening capital control after 1998 and failing to take appropriate measures to control exchange rate policies up until 2002. However, the indices lead us to believe that Uzbekistan completed its transition path by 2002 and is on right track since then which can be confirmed by a steady GDP growth rate of 7-8% annually for the period of 2002 to 2012. Nevertheless, the sum of indices of mere 1.4~1.5 pinpoints that there is a room for further development for Uzbek leadership to establish proper development policies to facilitate economic growth. In other words, this paper is the first attempt to analyze comprehensively the effectiveness and reasonability of development policies the leadership of Uzbekistan undertook for the past 20 years.

That said, the rest of the paper is organized as follows: (2) the literature review part goes over existing papers on the analysis of Uzbekistan's financial development and previous papers on Trilemma; (3) research method part outlines data sources and methodology used to calculate the indices; (4 & 5) empirical part interprets the indices for Uzbekistan; and finally (6) conclusion and remarks finish the paper.

## 2. Literature Review

The existing literature on the analysis of Uzbekistan's economic transformation is abundant with articles and research papers by many international and domestic scholars and organizations. Most of them provide general analysis on the economic transformation process in Uzbekistan as well as focus on specific areas such as exchange rates. Therefore, in this section we will go over major papers on Uzbekistan; and then we will explore the literature on financial trilemma, in particular, in the case of India by Hutchison et al (2010) to visualize the applications of trilemma indices in the case of a certain country.

### Previous papers on Uzbekistan

To begin with, Akimov and Dollery (2001, 2004, 2006, 2008a, 2008b, 2009a, 2009b, 2010) present an in depth analysis and overview of financial infrastructure development in Uzbekistan since the early days of independence in 1991. Authors concisely lay out the periods of foundations of current Uzbek financial system as:

- **Uzbekistan's Financial System before Independence**, being a part of Soviet financial system, heavily relied on banking system<sup>1</sup> which in turn consisted of Gosbank (the State Bank provided overwhelming majority of banking services such as granting short-term loans for working capital, overseeing enterprise plan fulfillment, monitoring wage payments, as well as creating money!) and other specialized banks such as Promstroybank (supporting industry and construction), Agroprombank (supporting agriculture), Sberbank (savings bank) and Vneshtorgbank (facilitating business involving foreign exchange transactions)

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<sup>1</sup> Non-bank financial institutions in the former Soviet Union were almost totally undeveloped and only a single insurance company i.e. Gosstrakh (State Insurance) which was fully owned and run by the government operated. Besides, there were no capital markets, money markets, foreign exchange markets in former Soviet Union.

● **Uzbekistan's Financial System development from 1991 to 2003** is characterized as a bold attempt to transform the financial infrastructure of Uzbekistan. In particular,

- **The Banking Sector** was transformed into two-tier banking system: (1) Central Bank of Uzbekistan (former Gosbank) to conduct monetary policy and supervise (2) commercial banks and other financial institutions in order to provide Uzbekistan with its own payment system. Two laws “On the Central Bank of the Republic of Uzbekistan” and “On Banks and Banking Activity” were adopted in December 1995 and February 1991 and were revised in April 1996 respectively. On the other hand, one of the highlights of this period is that in 1997 foreign assets earlier held by the Ministry of Finance at the National Bank of Uzbekistan were transferred to the Central Bank even though the NBU continues to be the depository institution of a large proportion of official gold reserves on behalf of the Central Bank. Besides, this period laid out the starting point for strict capital control and direct heavy government intervention in foreign exchange and financial markets. Accordingly, the government set the rule to limit enterprises to one account where enterprise deposits can be withdrawn only for the payment of wages and travel expenses in accordance with quarterly cash plans! On top of it, the government controls major commercial banks in order to prioritize credit lines for sectors, which is a clear sign how Uzbekistan's leadership intends to develop industrial capacity of the country.
- **Non-bank Financial Institutions** reforms were quite ambiguous but all in all not much of improvement has been done in terms of legal framework, accounting standards and regulations to manage this sector.
- **Securities Market** not surprisingly was underdeveloped as well since existing financial institutions were not mature enough and the only instruments available for the mobilization of savings were household saving accounts and term deposits at commercial banks respectively. However, the first Treasury bills (3 month and a year later 6 month) were introduced in March 1996 and authorities pushed

commercial banks to buy them even if they had negative interest bearing due to high inflation rates. As for equities market, stock exchange development was in parallel along with gradual pace of structural changes to privatize industries whereas in the first stage 90% of small enterprises were privatized completely by 1995, and in the second and third stages medium and large enterprises privatization began in 1996 and 1998 on selected and case-by-case condition respectively that was heavily criticized for its limited results.

Notably, Akimov and Dollery (2001, 2006, 2009) focus on key policy institutions, processes and legislative base. They provide a lot of similarities between Soviet era and independent Uzbek financial system. In fact, transforming into market economy and democratic system is not an easy challenge to overcome, so that policy makers in Uzbekistan had to be concerned with economic impact of harsh changes in the system. In these regards, authors underline advantages and disadvantages of (1) Market-Oriented and (2) Bank-Dominated Financial System. They point out that “no capitalists’ financial system is purely based on banks or capital markets but rather geared towards one of them and each nation has to create and design appropriate financial system based on national needs and constraints”.

Similarly, Ahmetov (2010) calls for deeper structural reforms in the financial sector. He argues that the financial sector is small; and approximately two thirds of bank assets remain in three major state-owned banks. He argues that more foreign investments must be attracted into existing private bank sector to increase competition in the banking sector. Accordingly, he argues that large state-owned banks and banks in which the bulk of equity belongs to the state must be privatized; foreign exchange earnings surrender requirement must be abolished and banks must be allowed to trade foreign exchange on the inter-bank market; as well as all non-banking functions of local banks (tax collection and non-essential reporting requirements) should be eliminated. Mandatory deposits of cash receipts by enterprises must be abolished and distinction between cash and non-cash payments

must be eliminated. Increase trust in the banking system by providing full and regular access to cash.

In the meantime, Ahmetov (2010) states that there is controversy between authorities and international financial institutions over how the role of the state and the private sector should evolve during the process of economic development and transition (business environment and trade policy). It also calls for abolishing high import excises, registration requirements for both exports and imports and avoiding frequent delays in access to foreign exchange despite the official adoption of full current account convertibility in order to reduce incentives for smuggling and encourage competition.

Also, Ahmetov (2010) makes another good point emphasizing Regional Cooperation to reduce trade costs that should be a priority for double-landlocked Uzbekistan and the countries in the region. The matter is there are significant trading complementarities between Uzbekistan and its regional neighbors that remain underexploited because of policy and institutional barriers, including trade-restricting policies and practices, weak cross-border cooperation, limited availability of multi-modal transport operations, high transit costs, and other 'behind the border barriers to trade'. Regional cooperation issues include trade, transport, and the water-energy. The challenges in trade policy include reduction of nontariff barriers and border related transaction costs. In transport aspects of regional cooperation the challenge is that transport costs are high and this requires building transport infrastructure as a transit for trade between Europe, People's Republic of China and the rest of the Central Asia.

Another interesting topic among scholars (Blackmon 2005, Pomfret 2000, Ruziev 2007, Zettelmeyer 1998) is exploring the so called "Uzbek Puzzle" that challenges researchers to identify key factors for paradoxical achievements of Uzbekistan vis-a-vie other FSU countries in the first decade of its transition period whereas it was expected that it would perform way below the average of that of FSU countries. In the contrary, Uzbekistan topped other FSU countries with its macroeconomic results (see Figure 3). The summary what authors believe are followings:

- Blackmon (2005) argues that economic integration with Russia is key to explain differences in post soviet performance of FSU countries. That said Uzbekistan was one of the least integrated with other FSU countries in terms of heavy industry. It could be on its own feet to manage exploiting its natural resources (gas and gold – the largest open-pit gold mine for cheap gold extraction) and to grow cotton with 60% rural population who had skills to grow agricultural products.
- Meanwhile, Zettelmeyer (1998) points out that low industrialization, specialization in cotton production and agricultural goods, as well as energy self-efficiency contributed to relatively successful macro-economic results rather than government policies undertaken after 1991 (See Figures 12 & 13 and Tables 1 & 2).
- Similarly, Pomfret (2000) calls for that favorable external factors such as world prices and marketing channel for gold and cotton that mitigated hard landing of Uzbekistan after 1991 (See Figures 12 & 13).

In other words, scholars pointed out that economic structure and favorable world prices for major export goods enabled Uzbekistan to outperform FSU countries in the beginning of transition period despite the fact that it was one of the least industrialized countries, (a) with the most population, (b) with one of the worst terms of trade conditions in Central Asia, to be above Tajikistan only, (c) heavy net importer of high-value added goods such as machinery, chemicals, processed food and light-industry goods (See Tables 1 & 2). In the contrary, Johnson & Islamov (1991) earlier predicted that despite the structural economic conditions Uzbekistan had pretty good chance to adapt to market-economy relatively easier since its population engagement structure had one of the highest rates in terms employment in private activity in FSU (See Table 4).

On the other hand, Rosenberg and Zeeuw (2001) outlined key points of Uzbekistan's foreign exchange regime development since 1995 and examined the impact of Uzbek foreign exchange policies onto the economy. They argue that exporters and importers equally suffer due to corruption

and bureaucratic nature of foreign exchange market transactions. The paper underlined that push mechanism<sup>2</sup> to make exporters to sell their receipts in foreign currency transfers that benefits only selected importers, prioritized by the government, which in the end creates unbalanced market conditions to encourage market participants in order to stay competitive. Therefore, the paper concludes with policy recommendations to unify multiple exchange rates<sup>3</sup> (See Figure 9).

Similarly, Hespeler (2011) examined monetary channels in Uzbekistan. He argued that the interest rate channel in Uzbekistan is very weak so that monetary transmission via the exchange rate is rather stronger, which is another underlining point in favor of establishing proper mechanisms of exchange rate policies. Accordingly, Hespeler (2011) argues that Central Bank of Uzbekistan is much concentrated on exchange rate targeting to control inflation but in the end CBU will find itself in trilemma since capital controls make it difficult to choose appropriate monetary growth rates to the rapid changes in economic structure of the country.

On the other hand, Akimov and Dollery (2008b) quotes that according to:

*“Ariff and Khalid (1999) ...there are three preconditions for policies mix in transition economies. (1) The absence of internal unrest and cross-country hostilities is fundamental and needs no elucidation. (2) Clear development planning is another important pre-requisite, a lack of which predetermined poor performance in a number of transition countries. (3) Strong institutions are also an important pre-condition that was often ignored in earlier literature. It is now clear that the fulfillment of these conditions determined the capacity of each country in transition to successfully implement a liberalization policy”*

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<sup>2</sup> Since there are two exchange rates (1. Official exchange rate; 2. Curb (black)) official currency exchange points and banks struggle to generate enough foreign currency to meet importers demand for foreign currency. As a result, Central Bank of Uzbekistan requires to sell 50% of foreign currency received by Exporters on their accounts at official exchange rate i.e. at loss of exporters considering the fact curbed rate is much higher than official one.

<sup>3</sup> Multiple Exchange Rate Unification officially began in the early 2000s but yet market curb yet does exists to present even though convertability of the currency has been officially introduced in October 2003 (Internatational Crisis Group, 2004)

### *Previous papers on Trilemma*

Trilemma Indices emerged based on Mundell-Fleming model that says a small, open economy must forgo the third among fixed exchange rate, national independence in monetary policy, and capital mobility. Accordingly, it is impossible to achieve all three of these policy goals at the same time. Prime examples in real life are (1) USA that does not have a control over Exchange Rate Stability due to its advanced financial infrastructure and global use of US Dollar; (2) China is famous for its strict capital control policies; and (3) EU that pursued Exchange Rate Stability abolishing national currencies to establish Euro.

With this in mind, Aizenman, Menzie, Chinn and Ito (2008a and 2008b) introduced Trilemma Indices to analyze global financial architecture over the time and see tradeoffs that policy makers face since increasing one trilemma variable (such as higher financial integration) would induce a drop in the weighted average of the other two variables (lower exchange rate stability, or lower monetary independence, or a combination of the two). They found that both industrialized and developing countries tend to liberalize capital mobility that comes at the expense of monetary independence and exchange rate stability (See Figure 6) as breakthroughs in technology reduced transportation costs and boosted fast exchange of information and data.

As for the implication of Trilemma Indices in a certain country, the paper by Hutchison M, Sengupta R, Singh N (2010) is of a particular attention. They have measured indices for Monetary Independence, Exchange Rate Stability, and Capital Openness (they slightly changed methodology part from that of Aizenman et al (2008) due to technical and data problems) in order to analyze the implication of changes in trilemma indices onto macro-economic outcomes. In particular, they argue that index results perfectly fit trilemma concept and; accordingly, they found that greater financial integration and corresponding loss of monetary independence and exchange rate stability influenced

inflation and inflation volatility in India.

Similarly, Aizenman and Sengupta (2011) carried out another case study of India and China as well. They analyzed implications of trilemma indices over a certain time onto macroeconomic results for both countries and found that both countries have been utilizing massive international reserves to reach the right balance in their policy objectives.

### **Research Purpose**

As you can see, previous papers regarding the analysis of Uzbekistan touch upon various aspects of development factors that can be summed up in Table 5. Each development factor has its own characteristics and nature as well as each factor can be controllable and uncontrollable. At the same time, each development factor should not be left out when politicians work on appropriate development policies. With this in mind, we can say that development policies play a key role in organizing and managing development factors, hence, it is very important to examine the appropriateness of development policies. To put it simple, this paper will measure Trilemma Indices for Uzbekistan in very similar way to that of India and China. This will enable us to observe and analyze the appropriateness of macro-economic policies for the past years since 1991.

### 3. Research Method

Since this paper is the first one to measure Trilemma Indices for Uzbekistan, this study will follow Hutchison et al (2010), which examined India's trilemma. Following the methodology of Hutchison et al (2010) this research analyzes economic data and performance of Uzbekistan since 1996 to 2009<sup>4</sup> applying "Financial Trilemma" concept to measure and see the trade-offs between macroeconomic policy preferences of the Government to manage Exchange Rates, Capital Control and Monetary Independence policies. This would allow us to better understand priorities of Uzbek government to reshape the national economy. This way, this paper makes a unique contribution to the existing literature on the analysis of financial and economic development policies in Uzbekistan.

#### **3.1 Data**

In general, there are numerous problems with data collection in relation to Uzbekistan. This makes the case for serious transparency issues in Uzbekistan. For some reason, there is no related data available from the Ministry of Statistics of Uzbekistan, Central Bank of Uzbekistan (except daily Exchange Rate which is available only per day only which means the researcher has to obtain every exchange rate on a daily basis from 2009 to 2012!) and even there is no hope from e-government portal at [www.gov.uz](http://www.gov.uz). Thus, the related data for trilemma indices was collected from a number of resources and papers such that:

- interest rates are obtained from:
  - (Uzbekistan) [www.tradingeconomics.com](http://www.tradingeconomics.com), from January 1996 to November 2012;
  - (USA) FED, from January 1996 to November 2012 at [www.federalreserve.gov](http://www.federalreserve.gov)
  - (Russia) Central Bank of Russia, from January 1996 to November 2012 at [www.cbr.ru](http://www.cbr.ru)

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<sup>4</sup> Period from 1996-2009 is chosen due to data issues in regards to KO index (Capital Openness Index).

- weekly exchange rates obtained from:
  - National Bank of Uzbekistan, from 1994 to 1996, from 2000 to 2005 at [www.nbu.uz](http://www.nbu.uz)
  - Rosenberg et al (2001) from 1997 to 1999
  - Central Bank of Uzbekistan from 2006 to 2012 at [www.cbu.uz](http://www.cbu.uz)

### **3.2 Methodology**

Hutchison et al (2010) also follows the trilemma index calculation based on Aizenman, Chinn & Ito (2008, 2010) whereas MI is Monetary Independence index, ERS is Exchange Rate Stability index, and KO is Capital Openness index respectively. However, Hutchison et al (2010) made a slight change to KO calculation since following Aizenman, Chinn & Ito (2008, 2010) results in constant index for India. To be precise, Hutchison et al (2010) integrated Foreign Direct Flows to calculate KO index – they used the ratio of the sum of inward and outward foreign investment flows to GDP. This way they made it possible to visualize dynamic changes in capital openness index rather than relying on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) that was used to measure KO index by Aizenman, Chinn & Ito (2008). However, this method has some drawbacks because it reflects not only policy stance but also that of market sentiment (Hutchison et al 2010: 10).

#### **MI Index.**

According to Aizenman, Chinn and Ito (2008), measuring MI is the reciprocal of the correlation of interest rates in home country (Uzbekistan) and the base country (the United States). Quarterly correlations are calculated using weekly interest rate data. The interest rates are set by Central Bank of Uzbekistan and the FED. The precise formula is

$$MI = 1 - \frac{corr(i_i, j_j) - (-1)}{1 - (-1)}$$

The scaling ensures that the index lies between 0 and 1, with the highest value indicating the greatest degree of monetary independence.

### **ERS Index.**

Once again, following Aizenman, Chinn and Ito, ERS index is the construction of adjusting for the differences in periodicity of the data. We calculate the quarterly standard deviations of the change in the log of the US dollar exchange rate (USD/UZS (Uzbek So'm)), and the index is then constructed according to the formula:

$$ERS = \frac{0.01}{0.01 + stdev(\Delta(\log(exch\_rate)))}$$

Again, the scaling ensures that the index lies between 0 and 1, with the highest value indicating the greatest degree of exchange rate stability.

### **KO Index.**

For construction of the KO index, this paper follows Aizenman, Chinn and Ito (2008). For Uzbekistan, this index is available from 1996 to 2009. However, this index is almost constant over the entire period, and may not capture well the changes that have occurred in Uzbekistan's management of the capital account. On the other hand, limitations of the data to have access to Uzbekistan's monthly FDI flows makes it impossible for this paper to make similar calculations as in Hutchinson et al (2010) where they chose to go with a simple de facto measure of capital account openness, using the ratio of the sum of inward and outward foreign investment flows to GDP. Therefore, Chinn-Ito index for Uzbekistan will be used which is available online for the period of 1996 to 2009 with the highest value indicating the greatest capital openness. However, when analyzing Chinn-Ito index we will refer to the data variables used in case of Uzbekistan.

#### 4. Empirical Analysis

In this section, we will examine the policy stance with respect to the trilemma using the indices constructed in the previous section, and then relate the trilemma concept to the accumulation of foreign reserves.

##### Periods.

Before we delve into results interpretation of indices it is important to go over the Uzbekistan's transition periods. To be precise, the historical data of GDP growth and International Trade in Uzbekistan reveals five unique periods (see Figure 2):

- **Period I** from 1991 to 1994 – characterized as establishing initial government institutions and reorganizing financial institutions. The foremost goal of the government was to mitigate the social impact of economic reformation whereas GDP did fall slightly while international trade kept steady falling since major industrial plants had to be shut due to domino effect in FSU countries' economic collapse.
- **Period II** from 1994 to 1999 – widely characterized as a new era of truly independent Uzbekistan with its own national currency and later unsuccessful import substitution policies in the midst of Cotton Crisis in 1996, Russian and Asian Crisis in 1998 (McKinley 2010; Akimov 2006). In fact, the mid of 1990s was the heyday of confidence for Uzbekistan's leadership and a critical point to diversify the economic structure of the country by laying out foundations for car manufacturing industry and reduce dependence on exports of cotton and commodity goods such as gold and cotton. These kinds of policies were intended for import-substitution and energy independence ambitions of the Government. At the same time, gross international reserves were headed for depletion due to massive imports

for newly established South-Korean auto-manufacturing Daewoo<sup>5</sup> plant that added a burden atop of low demand for cotton and gold in the world to earn much-needed US dollars. As a result, the government introduced “draconian” foreign exchange control policies instead of depreciating the currency further in order to reduce skyrocketed inflation down – a typical Trilemma case.

- **Period III** from 1999 to 2003 is widely described as reestablishing friendly relationship with US and Europe following the September 11 attacks in 2001. In financial realm it was translated as sharp depreciation of Uzbek So'm (UZS) against USD (132% in 2000, 112% in 2001 and 34% in 2002 – Akimov & Dollary (2004)). As a result, the inflation was kept at steady rate of 26-28% throughout the period unlike previous period when it did fall way back from 1281% to 26%<sup>6</sup> even at a time when a tight monetary policy was applied. In terms of trilemma indices, it translates as the volatility in ERS index that made some noise against MI index and GDP growth rate in short and medium term.

- **Period IV** from 2003 to 2007 is characterized as a period of steady growth rate at 7% per year. According to McKinley (2010), Devan (2012), Weitz (2012), USAID, CIA Factbook, this is due to favorable world prices for gold and major exporting goods as well as new restrictions on trade, including the regulation of the wholesale and retail trades, which affected the domestic marketing of imports (See Figures 12, 13). As a result, the first time in its history Uzbekistan recorded boosted surplus in current account.

- **Period V** from 2007 to Present is described as global legitimate recognition of Uzbekistan development model and importance of centralized government. The matter is during the recent Global Financial Crisis in 2007-2009 the world widely recognized the importance of central power. The very prime example of most scholars is China whereas centralized and tough financial regulations entail both advantages and disadvantages i.e. swiftness in times of government actions in times of crisis as well as challenges for financial liberalization (The Economist, 2012b).

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<sup>5</sup> Uzbekistan became 33 country of in the world to manufacture passenger cars in the World.

<sup>6</sup> **Source:** EBRD web site

## **MI Index.**

During the course of calculating MI Index, it was found that it is tricky to determine the base country. The matter is according to Aizenman, Chinn and Ito (2008a) the base country is the country that has most influence on home country's monetary policy. In other words, the base country should have strong ties with home country which in turn has a strong impact on international cash flow in and out of the home country. In these regards, Uzbekistan's major trade partner should be considered as a base country.

In that sense, Russia has the lion's share in Uzbekistan's trade followed by EU, Turkey, Rep. of Korea, China and others (see Figure 1). However, Aizenman, Chinn and Ito (2008a) refer to Shambaugh (2004) where the base countries are assigned based on IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* and *CIA Factbook*. Accordingly, Uzbekistan's base country is determined as the US.

However, comparing MI Indexes based on Russian and American interest rates provides us very interesting points (see Figure 4). Namely, at first it seems that Uzbekistan had much independent monetary policy in relation to the US rather than Russia. However, we have to keep in mind that Uzbekistan and Russia had very similar monetary policies since economic crisis was identical due to historic nature of both countries. Therefore, throughout 1990s it looks like that Uzbekistan was very much dependent on Russian interest rate policies but in fact it both countries took similar policies to fight against inflation.

This point can be clearly seen as both countries steadily cut off interest rates in the same manner except in 2010 (please refer to RAW DATA on interest rates).

Furthermore, Uzbekistan as one of the developing countries fits the general trend analyzed by

Aizenman *et al* (2008b) to have similar monetary policies as the other developing countries in the world (Please see figure 6 and 7.)

### **ERS Index.**

Running through the data for ERS Index calculation revealed us very volatile trend line as it was expected in accordance with Hespeler (2011) who argues that the only effective channel to control monetary transmission is via exchange rate channel (See Figure 5).

ERS index results support that government exchange rate unification policies taken in 2000 provided exchange rate stability in Uzbekistan, even though, more has to be done in years to come. On the other hand, steady depreciation of UZS against USD depicts strong commitment of Uzbek government to establish full currency conversion to facilitate business environment in the country.

On the other hand, steady international reserves accumulation and depreciation of Uzbek so'm is a paradox especially in a time when Central Bank of Uzbekistan is seeking tight monetary policy (see Figures 7, 8, 9 & 10). This can be translated a sign that Government believes that there is a huge gap between official government exchange rate (the one that is determined by Central Bank of Uzbekistan for the purpose of collecting customs duty fees and other fees associated with USD) and curb rate (market rate) which in the end reflects challenges associated with currency convertibility in the country.

### **KO Index**

As it was mentioned earlier, due to data limitations to obtain monthly foreign direct investment flows, we will analyze Chinn-Ito index referring to its major determinant dummy variables such as:

- variable indicating the presence of multiple exchange rates (k1)
- variable indicating restrictions on current account transactions(k2)
- variable indicating restrictions on capital account transactions (k3)
- variable indicating the requirement of the surrender of export proceeds (k4)

Namely, speaking of all these dummy variables  $k1$ ,  $k2$ ,  $k3$  &  $k4$  Uzbekistan officially introduced them in 1997 (Rosenberg & Zeeuw, 2000). This kind of trade policy targeted to support government led investment projects in auto-industry and other related import-substitution projects. Since then Uzbekistan has been much criticized for creating unfavorable business climate by making it difficult to access foreign currency convertibility for small and medium size private businesses. As a result of international pressure, in particular by EBRD, Multiple Exchange Rate Unification officially began in the early 2000s and was officially introduced in October 2003 along with full currency convertibility for current account transactions (International Crisis Group, 2004). But at the same time, there was no sign of reforms in regards to capital account transactions and surrendering export proceeds yet (PwC, 2011). Figures 7, 8, & 9 depict this policy impact in figures i.e. KO (Chinn-Ito) index drops in 1997 to its lows and ascends in 2003 and stays the same due to partial reforms in the country.

### **The Case of China?**

Once all the calculations have been carried out to measure Trilemma Indices for Uzbekistan, the index results have been a bit of a surprise. Linear regression results of Trilemma indices (see Appendix 3 a, b, c) run in a similar manner to that of Aizenman *et al* (2008a, 2008b) and Hutchison *et al* (2010) to test Trilemma index implications in regards to trade-offs that policy makers face, do not support Trilemma concept as it was in the case of China by Aizenman and Sengupta (2011). According to Aizenman and Sengupta (2011: p.11):

*“..one possible interpretation is that the segmentation of the domestic capital market in China and*

*the capital controls applied there implies that the “policy interest rate” is not reflecting of the stance of monetary policy. This would be the case if a large share of borrowing is allocated directly by the state banking system, with preferential treatment of the state owned enterprises (SOE), and if the supply of credit to the private sector is segmented. Another unique feature of China is a combination of more stringent capital controls and massive hoarding of IR. China has been increasing its IR/GDP relentlessly without signs of convergence to a target IR/GDP during the sample period. These policies may relax the Trilemma constraints in the intermediate run...”*

Likewise, Uzbekistan is notorious for its strict capital control policies and very much centralized planning authority over its financial institutions having government stake in major lending institutions. Similarly, Uzbekistan practices preferential treatment of state owned enterprises providing government guarantees. However, unlike in China CBU practices tight monetary policy to keep inflation under control by slowly depreciating UZS against USD based on gross international reserves and monetary policy targets. This is well supported with R-square of more than 68% when we run a regression using data from 1992 to 2009 making UZS/USD exchange rate (FX) as a dependent variable while making growth international reserves (RESERVE) and money supply (M3) independent variables (see Appendix 3d).

On the other hand, another newly emerged factor for Uzbekistan is its hardworking population, more than 2 million migrant workers in Russia, Kazakhstan, South Korea, United States and Europe, send money to their families which makes up nearly 10% of GDP (UNDP, 2011; Erica Marat, 2009). The ramification of international remittances is another noise in interpreting Trilemma indices since big inflow of USD as cash mitigates the pressure CBU feels to depreciate UZS well enough edge out curb market rate. However, due to practical impossibility<sup>7</sup> for enterprises to engage in cross-border money wire-transfers through the local banks, enterprises engage in informal ways to transfer the money abroad to pay for goods abroad. This offsets the mitigation from international

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<sup>7</sup> Even though officially enterprises have access to exchange UZS into USD and send over to pay for imports, they have to wait the decision by local CBU to make this transfer happen.

remittances and further exacerbates the difference between official and curb market exchange rates which in turn validate the argument by Rosenberg and Zeeuw (2001) in terms of discriminative welfare effects on the economy of Uzbekistan. In the meantime, this is both sad and alarming signal for data validity to analyze ERS, MI indices. In that sense, regression results do not support Trilemma concept to visualize policy trade-offs that government faces.

### **Results summary.**

Nevertheless, referring to three periods (II, III, IV) that fall under Trilemma Index results for 1996 – 2006: (1) from 1996 to 1999, (2) from 1999 to 2003, (3) from 2003 to 2006 we can see how the government changed its policy preference over the years in face of macroeconomic results of the country (see Figures 2, 7, 8, 12, 13).

In particular, starting from fall in 1996 foreign reserves got depleted when world cotton prices dropped that contributed Uzbekistan's major inflow of USD and hence the government introduced draconian exchange rate controls (Pomfret 2000, BTI Country Report 2012). This is reflected as an increase in MI index and "V" shaped change in ERS index.

Starting in 1999, the authorities followed guidelines by IMF to unify multiple exchange rates as a result; we can see a rebalancing between Trilemma indices. In particular, soaring ERS and KO indices in 2000 offsets the increase in MI index. This can be seen as CBU's intention towards stronger monetary independence at a time when so called "recommendations from the west" were introduced.

However, the analysis reveals that ironically KO index was expected to strengthen instead of plummeting; which implies that Uzbek government was reluctant to liberalize international financial flows while it unified official multiple exchange rates and introduced full currency convertibility in 2003. This can be explained with introduction of possibly new types of capital flow restrictions listed

in Appendix 2.

On the other hand, introduction of full convertibility of USD in 2002 and authorities' decision to resume it again in 2003 was reflected in Trilemma indices as a sharp change in ERS and KO indices. However, stable GDP growth rates accompanied by favorable world prices for major export goods enabled Uzbekistan sustain greater integration with global economy from 2003 to 2006.

From 2006 to 2009, CBU has kept tight monetary policy and at the same time it depreciated national currency as the country got more integrated into global trade with quite positive macroeconomic results, especially, due to soaring world prices for gold and gas prices, and cotton.

For sure, panoramic representation of government monetary policies in Figure 7 does have a lot of implications. To some extent it supports the notion that government of Uzbekistan truly completed its transition period by 2002 following IMF recommendations to simplify exchange rate processes to create favorable conditions for businesses, at least, in terms of exchange rate stability.

Besides, from the graphs (see Figure 7, 8, 11a) we can see that the government of Uzbekistan truly prioritizes exchange rate stability in the wake of increasing its share in global trade which is in line with results found by Aizenman et al (2008b) in regards to Trilemma indices in case of emerging and developing countries (see Figure 6). Specifically, Figure 11a reveals us a very interesting phenomenon of how a newly independent country experienced a bitter taste of recognizing the importance of tuning monetary policy to national trade policy. Represented periods in Figure 11a from 1996-1999, 2000-2002, 2003-2006, and 2007-2009 show us how Uzbekistan failed in the first two periods to establish appropriate policies until the third period, which is clearly represented by how the area of triangles changed over the periods i.e. the bigger the area the more efficient policies were established no matter in what direction. In our case, Uzbekistan clearly headed to prioritize proper exchange rate stability and monetary independence.

## 5. Case: Uzbekistan vs. FSU (Kazakhstan)

Another perspective to spice up the paper is to recap the development story of Uzbekistan *vis-a-vie* other FSU country. And in this case it would be perfect to compare Trilemma indices' dynamics in case of Uzbekistan and Kazakhstan as it used to be in many other research papers.

In particular, Uzbekistan and Kazakhstan are the most populous countries in Central Asia. However, they adopted two different paths to transform the economy after the collapse of Soviet Union in 1991. In addition, speaking of their similarities, one can say that they both experienced Centralized Planning System for 71 years and used to have similar GDP structure and macroeconomic indicators according to Alam & Banerji (2000). At the same time, both countries varied from each other in terms of natural resource endowment Kazakhstan having advantage in energy resources and metals and respectively edging out Uzbekistan in extractive industrial out by 5 times, while Uzbekistan used to specialize in cotton production and agriculture (see Appendix 4). Accordingly, Blackmon (2005) argues that economic ties between Kazakhstan and Russia used to be much stronger due to economic infrastructure of Kazakh economy and its proximity to Russia than those of Uzbekistan which is a strong base to argue that Kazakhstan reforms used be much like the ones in Russian Federation. Therefore, Kazakhstan and Uzbekistan's transition indicators differed given the chosen strategy by its leaders (see Figure 16).

Likewise, similar conclusions can be made as in other papers (Akimov and Dollery 2008a & 2008b; Blackmon 2005; Pofret 2000; Zettelmeyer 1998) when Trilemma indices of Uzbekistan and Kazakhstan are visualized in graphs (see Figure 11).

To be precise, given the economic structure of two countries as well as much faster reforms taken in Kazakhstan discussed earlier, more dynamic development of Trilemma indices can be found

in case of Kazakhstan compared to Uzbekistan, that lags behind Kazakhstan. In other words, comprehensive analysis of figure 11, which depicts selected years, reveals us that in the beginning in 1996 both countries had very similar reforms however by 1999 Kazakhstan began to reform its monetary policies and then exchange rate regulations at much faster rate while Uzbekistan headed the same direction at much slower rate which is clearly depicted in triangle shape dynamics as well.

## **6. Conclusion**

The analysis of financial development process in Uzbekistan is a difficult task. The challenge for researchers consists of arduous determination to obtain official statistical reports and properly examining them, since the reported data usually misleads casual outsiders to Uzbekistan. With this in mind, this section provides a brief summary of previous studies, related to this topic, visa-a-vie empirical results of this research paper.

Mainly, all scholars and researchers criticize the pace of reforms in Uzbekistan and recommend establishing policies towards financial liberalization in the wake of global integration of Uzbekistan. In particular, Akimov & Dollery (2004, 2008a&b, 2009a&b), outlined the financial infrastructure nature and development process in Uzbekistan and they argue that Uzbekistan should enhance its financial infrastructure in order to create better business environment for foreign investors.

On the one hand, scholars such as Blackmon (2005), Pomfret (2000), Zettelmeyer (1998) recognize the importance of external factors such world prices for gold and cotton in reshaping macroeconomic results of Uzbekistan during the first half of its transition period from 1991 to 1999. They argue that favorable external factors and the nature of its economic structure mitigated the hard-landing of Uzbek economy compared to other FSU countries which should not be credited to macroeconomic policies of Uzbek government under President Karimov. Indeed, one can validate this argument comparing the correlation between Uzbekistan's macroeconomic indicators (GDP, CPI, International reserves, Trade volume and etc) visa-a-vie world prices for Uzbekistan's major export goods such as gold and cotton.

On the other hand, we should give credit to the government for diversifying the economy

that can only be done by shuffling development policies. In particular, the trilemma indices for Uzbekistan highlight how Uzbekistan completed its transition period by 2002 and has been building up proper policies taking into account other development factors such as world prices, economic infrastructure, natural resource endowment and etc.

In other words, the Trilemma indices reflect the notion indeed the newly established government of Uzbekistan of 1990s was not effective due to other factors such as political and social mind of people and elite in Uzbekistan, systemic regime adherence and misunderstanding of market economy and others. Thus, Uzbekistan failed to establish appropriate monetary and trade policies to transform the country in the faster pace. However, since 2002 to present the indices point out that Uzbekistan truly determined its path and has been building up its way, yet there is more to be done.

## References

- Akimov, A (2001) *Reforming the Financial System. The Case of Uzbekistan*, CASE
- Akimov, A and Dollery, B (2004) *Uzbekistan's Financial System: An Evaluation of Twelve Years of Transition*
- Akimov, A and Dollery, B (2008a) *Kazakhstan: Financial system reform over the period 1993 to 2006 and its socioeconomic effects*, Emerging Market Finance and Trade, vol. 44, no. 3, pp. 81-97.
- Akimov, A and Dollery, B (2008b) *Financial policy in transition economies: Architecture, pace and sequencing*, Problems of Economic Transition, vol. 50, no. 9, pp. 6-26.
- Akimov and Dollery (2009a) *Financial development policies in Uzbekistan: An analysis of achievements and failures*, Economic Change and Restructuring, vol. 44, no. 4, pp. 293-318.
- Akimov, A and Dollery, B (2009b) *Financial sector reform in Uzbekistan: Theoretical foundations and policy analysis*, Lap Lambert, Cologne.
- Akimov, A and Dollery, B (2010) *Financial reforms in Indonesia and South Korea in the 1980s and early 1990s*, Journal of Emerging Market Finance, vol. 9, no. 1, pp. 25-49.
- Aizenman, J., Chinn, M., Ito, H (2008a) *The "Impossible Trinity" Hypothesis in an Era of Global Imbalances: Measurement and Testing*.
- Aizenman, J., Chinn, M., Ito, H (2008b) *Assessing the Global Financial Infrastructure: Measuring Financial the Trilemma's Configurations Over a Time*
- Aizenman J., Sengupta R. (2011) *The Financial Trilemma in China and a Comparative Analysis with India*, UCSC and the NBER; IFMR, India
- Ahmetov K (2010) *Uzbekistan: Economic Trends and Problems*
- Alam A., Banerji A (2000) *Uzbekistan and Kazakhstan: A tale of two paths?*
- Blackmon, P. (2005) *Back to the USSR: why the past does matter in explaining differences in the economic reform processes of Kazakhstan and Uzbekistan*, Central Asian Survey, 24:4, 391-404
- Bodenstein, T., Plümperb, T., Schneider, G (2003) *Two Sides of Economic Openness: Non-Tariff*

*Barriers to Trade and Capital Controls in Transition Countries, 1993-2000*, KOPS

- Devan J. (2012) *The Vital Economic Role of the Private Sector, In Uzbekistan and Globally*, World Bank, Tashkent
- Erica Marat (2009) *Shrinking Remittances Increase Labor Migration from Central Asia*, CACI ANALYST
- Hespeler, F. (2011) *A VECM Evaluation of Monetary Transmission in Uzbekistan*, IFMRDME
- Hutchison, M., Sengupta, R., Singh, N (2010) *India's Trilemma: Financial Liberalization, Exchange Rates and Monetary Policy*, MPRA
- Johnson, S., Islamov B. (1991) *Property Rights and Economic Reforms in Uzbekistan*, WP90
- McKinley T. (2010) *The Puzzling Success of Uzbekistan's Heterodox Development*, CDPR, University of London [ <http://www.soas.ac.uk/cdpr/publications/dv/file56073.pdf> ]
- Rosenberg & Zeeuw (2001) *Welfare Effects of Uzbekistan's Foreign Exchange Regime*
- Sintserov L (1998) *The Post-Soviet Automobile Industry. First Signs of Revival*. Actes du GERPISA n° 28 [ <http://gerpisa.org/ancien-gerpisa/actes/28/28-9.pdf> ]
- Weitz R. (2012) *Uzbekistan's Economic Reforms and Their Challenges*, CACI-Analyst, Johns Hopkins University [ <http://www.cacianalyst.org/?q=node/5876> ]

### Online Publications

- [Bestsellingcarsblog.com](http://bestsellingcarsblog.com) 2003 Achieve [ <http://bestsellingcarsblog.com/2003/01/09/russia-1996-2002-lada-110-samara-and-210457-on-top/#more-3749> ]
- Baker & Mc Kenzie (2009) *Doing Business in Uzbekistan*, January edition, [Accessed in September 2012]
- Price Waterhouse Coopers (2011) *Guide to Doing Business and Investing in Uzbekistan*, 2011 edition [Accessed in September 2012] [www.pwc.com/uz](http://www.pwc.com/uz)
- The Economist (2012a) *In praise of North Korea and Uzbekistan*
- The Economist (2012b) *China. Paradox of Prosperity*

- EconStats. Online Database. <http://www.econstats.com/weo/CUZB.htm>
- USAID (2010). *Uzbekistan's Economic Prospects and Challenges* [Accessed in June 10, 2012] <http://egateg.usaid.gov/sites/default/files/Uzbekistan%20Final.pdf>
- UNDP (2011) *Remittances in Europe and Central Asia: between the Euro crisis and Russia's growth prospects*  
[<http://europeandcis.undp.org/uploads/public1/files/vulnerability/Data%20bases/Fast%20facts/Fast%20facts%20on%20the%20move%2010%20Feb%202012.pdf>]
- The Guardian (2003) *EBRD issues Uzbekistan with reform ultimatum*, by Mark Milner [Accessed in June 10, 2012] <http://www.guardian.co.uk/business/2003/mar/17/1>
- International Crisis Group (2004) *The Failure of Reform in Uzbekistan: Ways Forward for the International Community*, Asia Report

## Appendix

### Appendix 1. Trilemma Data Details and Sources

Variable Name	Description	Components	Data Sources
MI	Monetary Independence Index	Domestic and US, Russian interest rates	<ul style="list-style-type: none"> <li>● Uzbekistan: Monthly Interest rates from <a href="http://www.tradingeconomics.com">www.tradingeconomics.com</a></li> <li>● USA: Monthly Interest rates from <a href="http://www.federalreserve.gov">www.federalreserve.gov</a></li> <li>● Russia: Monthly Interest rates from <a href="http://www.cbr.ru">www.cbr.ru</a></li> </ul>
ERS	Exchange Rate Stability Index	Domestic Exchange rate	<p>Weekly exchange rate from</p> <ul style="list-style-type: none"> <li>● <a href="http://www.nbu.uz">www.nbu.uz</a> (1994-1996; 2000-2005)</li> <li>● Rosenberg et al (2001) for 1997-1999</li> <li>● <a href="http://www.cbu.uz">www.cbu.uz</a> (2006-20012)</li> </ul>
KO	Capital Openness Index	<ul style="list-style-type: none"> <li>● Existance of multiple exchange rates</li> <li>● Presence of restrictions on current account and capital account transactions</li> <li>● Requirements of the surrender of export proceeds</li> </ul>	<ul style="list-style-type: none"> <li>● Aizenman, Ito, Chin (2008)</li> <li>● <a href="http://www.imfareaer.org">www.imfareaer.org</a>.</li> </ul>

## Appendix 2. AREAER Report Variables

### TRADE

- Documentation requirements for release of foreign exchange for imports
- Import licenses and quotas
- Repatriation requirements
- Surrender requirements
- Export licences
- Export taxes
- Investment transactions
- Repatriation requirements for invisible transactions
- Surrender requirements for invisible transactions

### CAPITAL

- Exchange taxes
- Foreign exchange accounts held domestically (residents) permitted
- Foreign exchange accounts held abroad (residents) permitted
- Foreign exchange accounts permitted (non-residents)
- Domestic currency accounts permitted (non-residents)
- Controls on commercial credits
- Controls on foreign direct investments
- Controls on liquidation of foreign direct investment

**Source:** IMF, Annual Report on Exchange Arrangements and Exchange Restrictions cited at Bodenstein et al (2003)

### Appendix 3. Linear Regression results

A)

Dependent Variable: ERS  
 Method: Least Squares  
 Date: 12/20/12 Time: 00:57  
 Sample: 1996 2009  
 Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KO	1.020560	0.682046	1.496322	0.1604
MI	0.666215	0.209843	3.174831	0.0080
R-squared	0.054860	Mean dependent var		0.508608
Adjusted R-squared	-0.023901	S.D. dependent var		0.217689
S.E. of regression	0.220275	Akaike info criterion		-0.056319
Sum squared resid	0.582251	Schwarz criterion		0.034975
Log likelihood	2.394233	Hannan-Quinn criter.		-0.064770
Durbin-Watson stat	0.840086			

B)

Dependent Variable: KO  
 Method: Least Squares  
 Date: 12/20/12 Time: 00:58  
 Sample: 1996 2009  
 Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERS	0.154075	0.102969	1.496322	0.1604
MI	0.118709	0.105155	1.128900	0.2810
R-squared	0.064799	Mean dependent var		0.144081
Adjusted R-squared	-0.013135	S.D. dependent var		0.085031
S.E. of regression	0.085588	Akaike info criterion		-1.946985
Sum squared resid	0.087903	Schwarz criterion		-1.855692
Log likelihood	15.62890	Hannan-Quinn criter.		-1.955436
Durbin-Watson stat	0.423482			

C) .

Dependent Variable: MI  
 Method: Least Squares  
 Date: 12/20/12 Time: 00:59  
 Sample: 1996 2009  
 Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERS	0.685230	0.215832	3.174831	0.0080
KO	0.808745	0.716401	1.128900	0.2810
R-squared	-12.517530	Mean dependent var		0.535790
Adjusted R-squared	-13.643991	S.D. dependent var		0.058378
S.E. of regression	0.223396	Akaike info criterion		-0.028177
Sum squared resid	0.598870	Schwarz criterion		0.063117
Log likelihood	2.197241	Hannan-Quinn criter.		-0.036628
Durbin-Watson stat	1.122152			

D) .

Dependent Variable: FX  
 Method: Least Squares  
 Date: 12/20/12 Time: 01:34  
 Sample: 1992 2009  
 Included observations: 18

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESERVE	134.7462	12.38772	10.87740	0.0000
M3	-0.890368	0.311217	-2.860929	0.0113
R-squared	0.683295	Mean dependent var		692.6346
Adjusted R-squared	0.663501	S.D. dependent var		542.7869
S.E. of regression	314.8628	Akaike info criterion		14.44659
Sum squared resid	1586218.	Schwarz criterion		14.54552
Log likelihood	-128.0193	Hannan-Quinn criter.		14.46023
Durbin-Watson stat	0.570164			

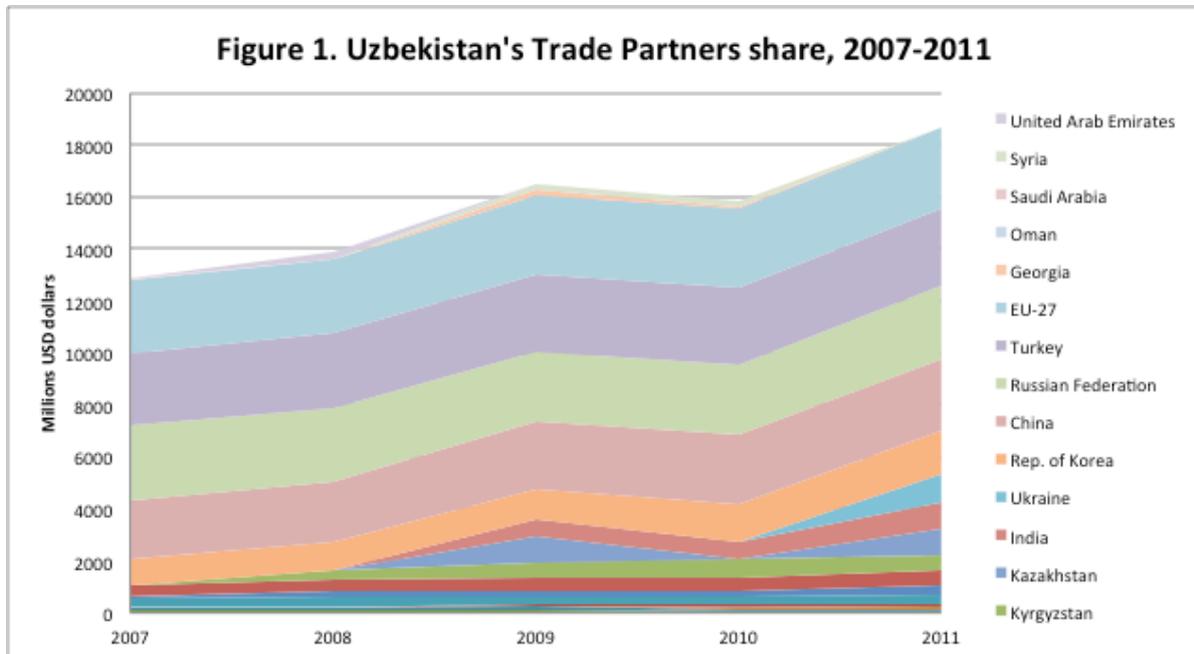
Appendix 4. Uzbekistan and Kazakhstan Initial Years Compared (1990)

	UZB	KAZ
<b>SIMILAR</b>		
Political Structure		
Number of years of Soviet Central Planning	71	71
Change in leadership upon Independence	NO	NO
Structure of Economy		
Share of Agriculture in Output (%)	31	29
Share of Industry in Output (%)	33	34
Share of Services in Output (%)	36	37
Macroeconomic Indicators		
Repressed inflation	25.7	25.7
Black market exchange rate (% diff. over official rate)	1.828	1.828
External Debt (% of GDP, 1991)	0	0
Social Indicators		
Life expectancy at birth (1981-1990)	68.1	68.2
Secondary school enrolment rate (%)	98	99
<b>DIFFERENT</b>		
Demographic Structure		
Population (million)	23	15
Urban population (% of total)	40.6	57.6
Share of population under 16	60	40
Population growth rate (%)	2.5	1.2
Percentage of dominant ethnic group (1993)	70	43
Structure of Economy		
Share of Extractive industry in industrial output	12	65
Share of manufacturing and food in industrial output	70	33
Natural resource endowment and production	moderate	high
Proved recoverable oil reserves (mil metric tons)	41	449
Macroeconomic indicators		
GNP per capita (PPP, US\$ 1989)	2,740	5,130
GDP (billions USD)	23.7	40.3
Exports (% of GDP)	29	74

**SOURCE:** Alam & Banerji (2000)

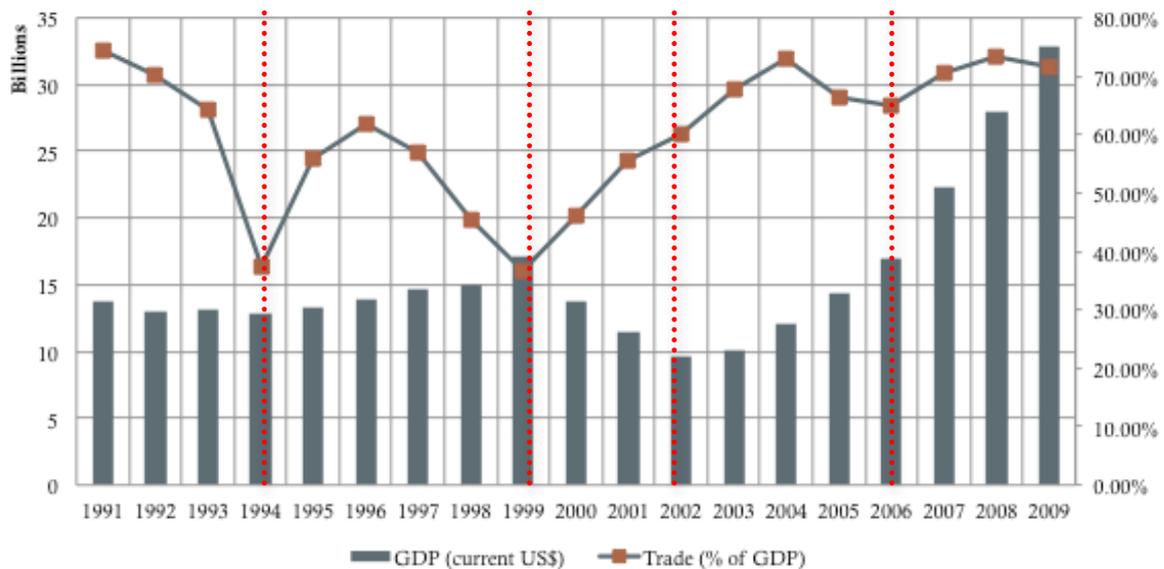
## Figures

**Figure 1.** Uzbekistan's Trade Partners share, 2007 – 2011



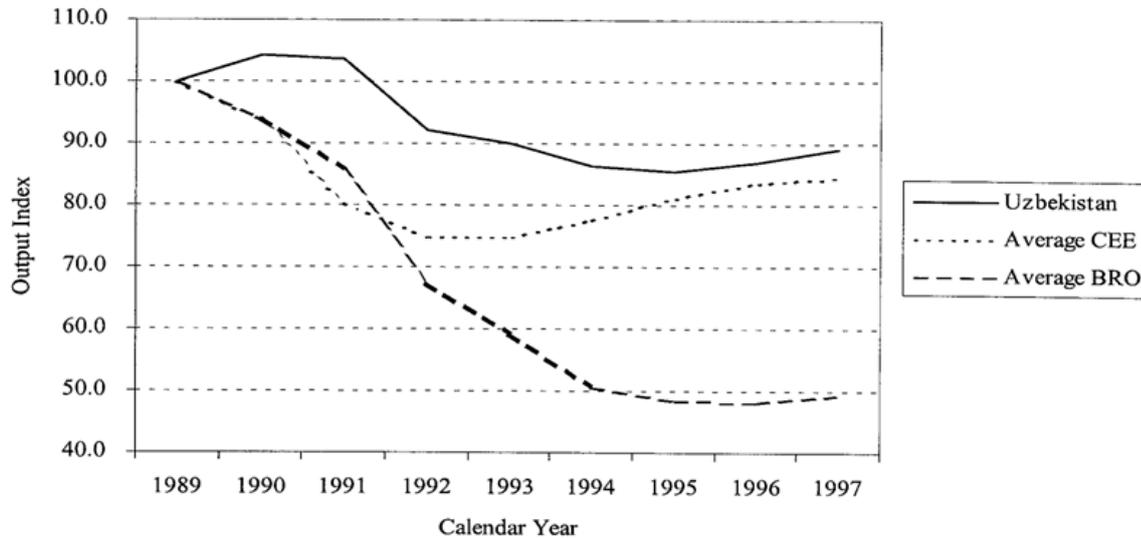
Source: UN Trade.com and author's own calculation

**Figure 2.** Uzbekistan's GDP and Trade, 1991 – 2009



Source: UN Trade.com and author's own calculation

**Figure 3.** Output Paths in Calendar Time (1989-100)



Source: Zettelmeyer (1998)

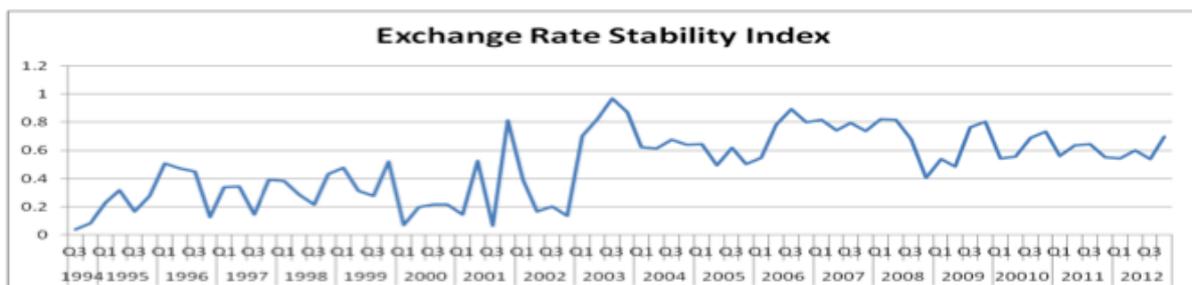
\* CEE – Central and Eastern European transition economies

\* BRO – Baltics, Russia and other Former Soviet Union transition economies

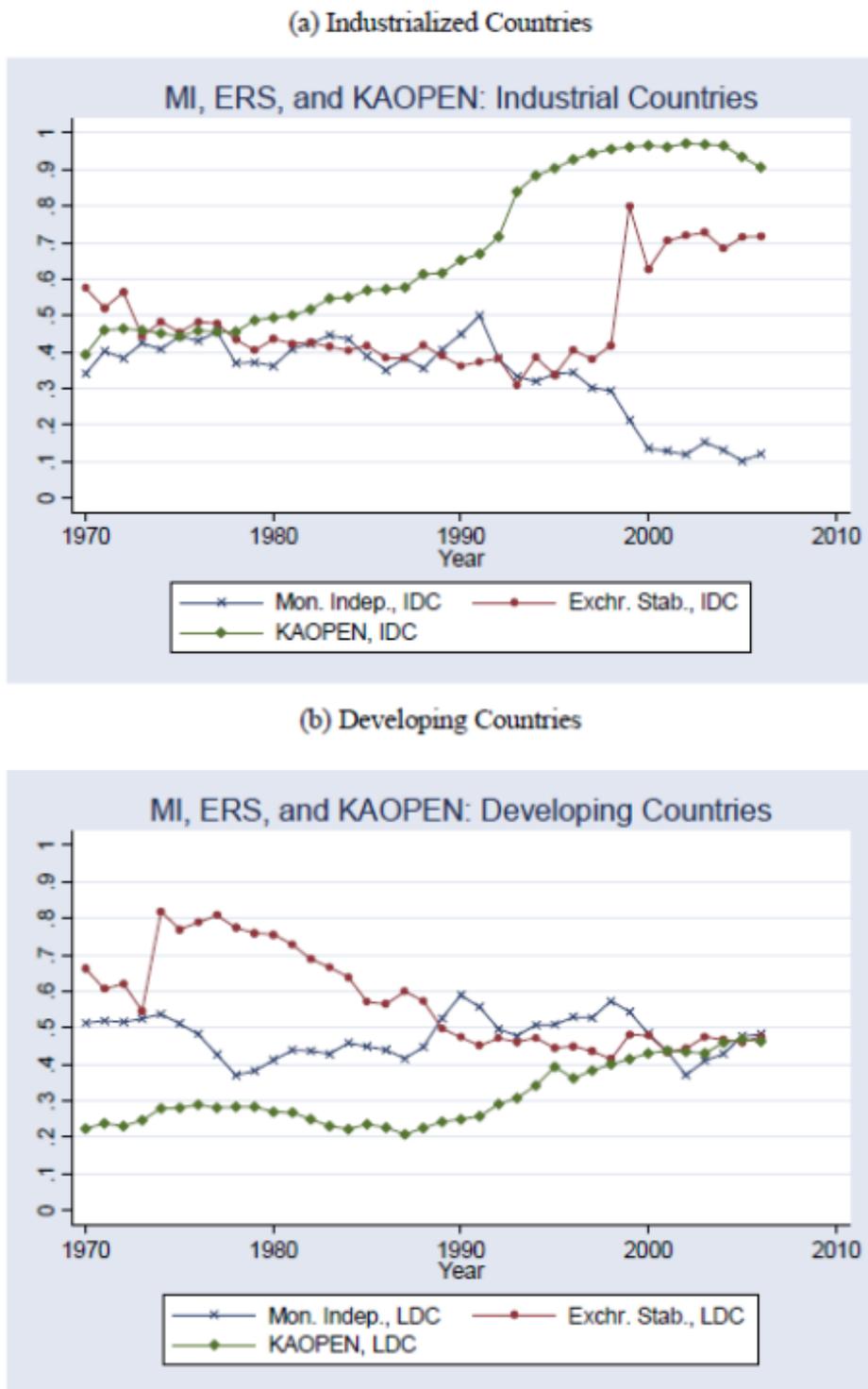
**Figure 4.** MI Indices Russia vs US base country, 1994 - 2012



**Figure 5.** ERS Index, 1994 – 2012

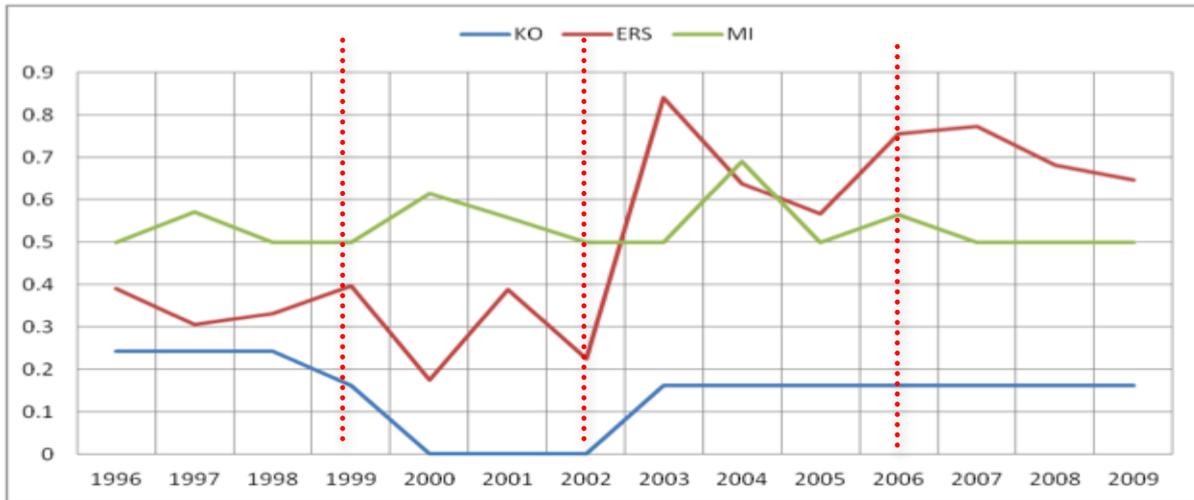


**Figure 6.** Development of Trilemma Indexes

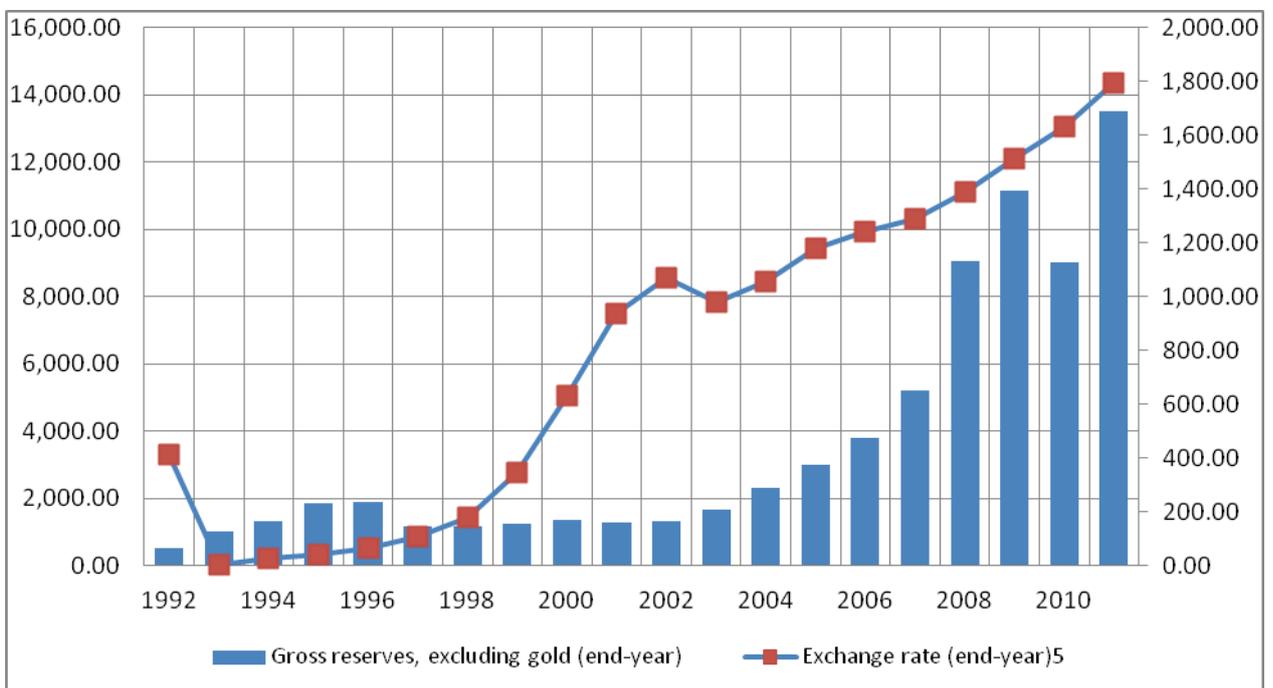


**Source:** Adopted from Aizenman et al. (2008b)

**Figure 7.** Trilemma Indices, 1996 – 2006

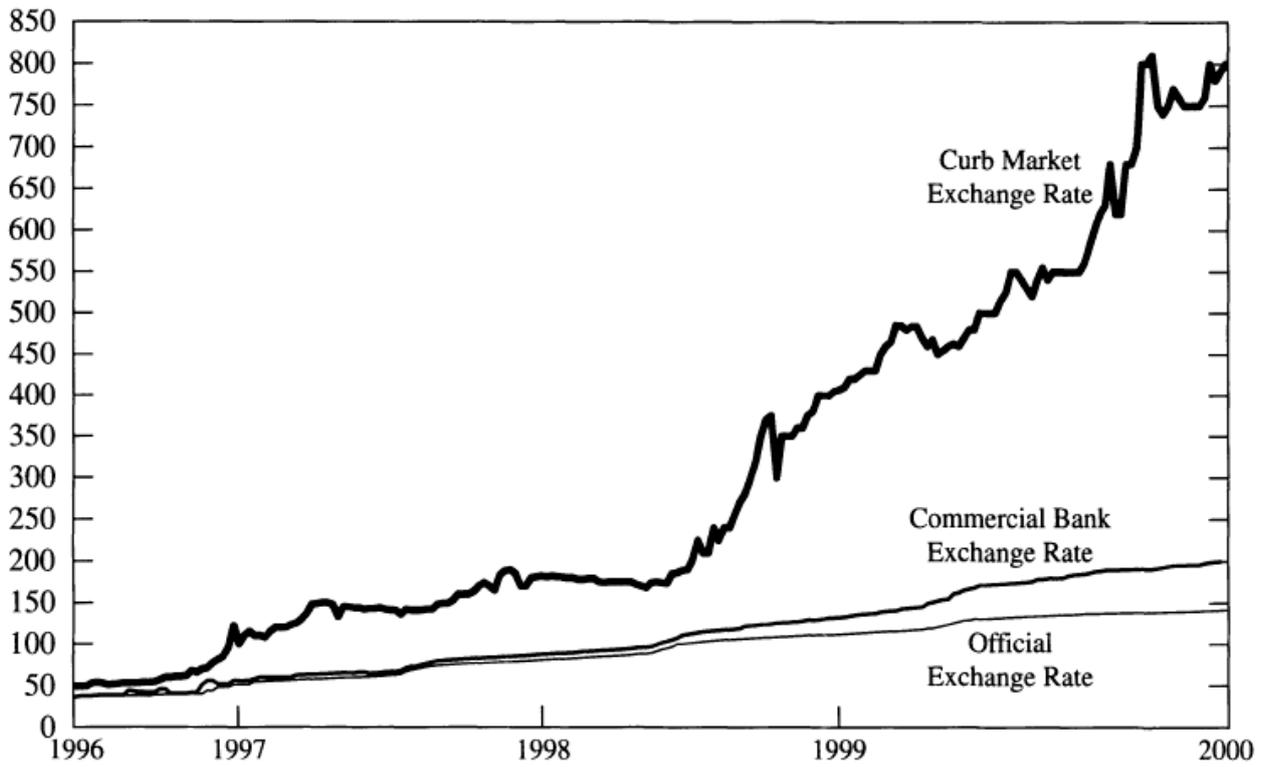


**Figure 8.** Gross reserves and USD/UZS exchange rate



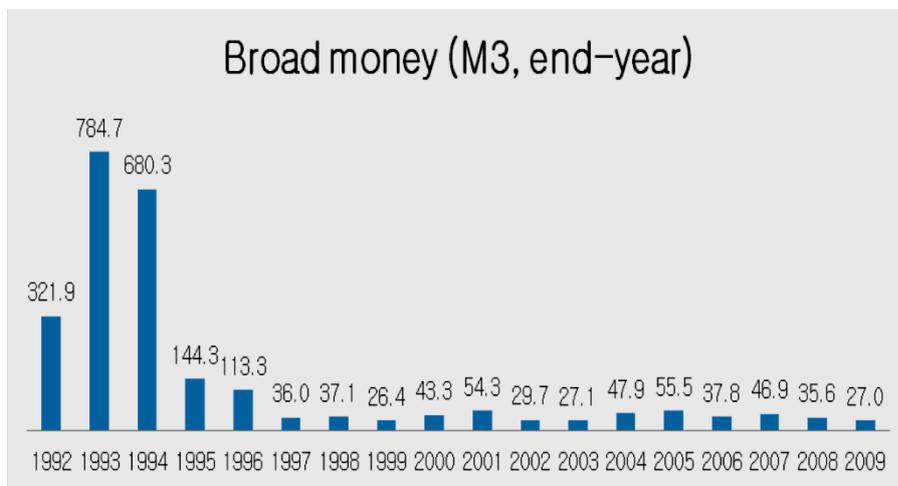
Source: EBRD

**Figure 9.** Multiple Exchange Rates in Uzbekistan, 1996-2000



Source: Rosenberg & Zeeuw (2001)

**Figure 10.** Broad Money in Uzbekistan, 1992-2009



Source: EBRD

**Figure 11**

a) Trilemma Indices change over the periods, 1996 – 2009

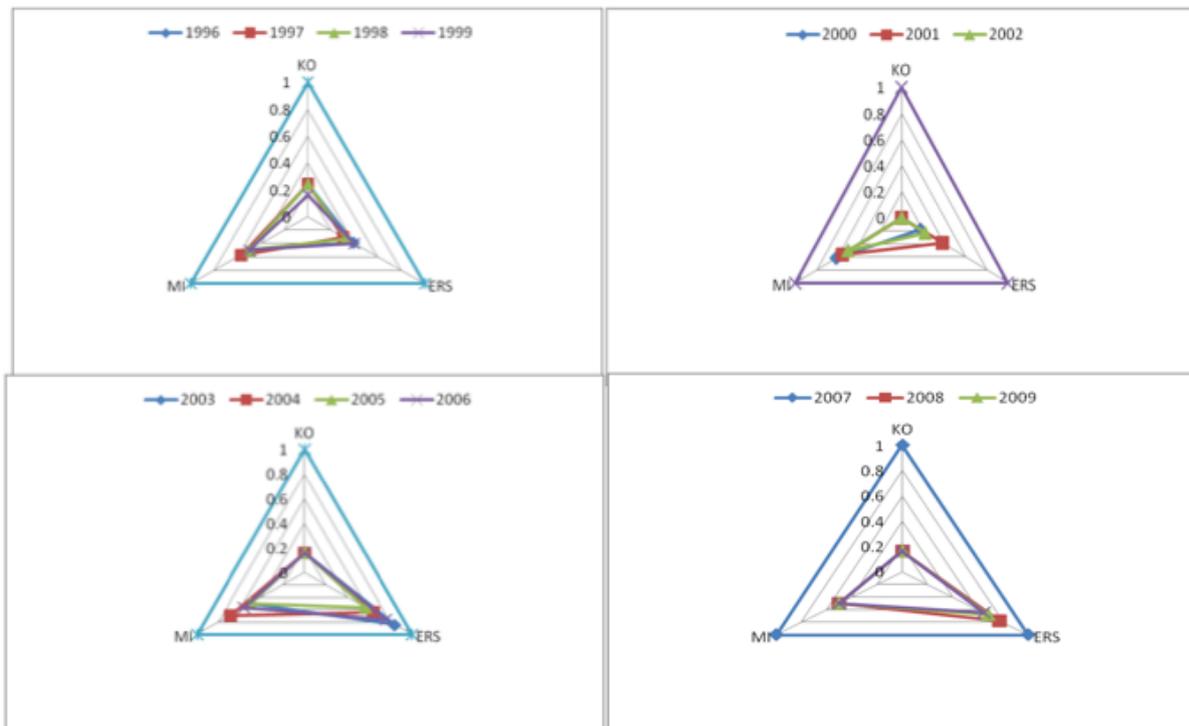
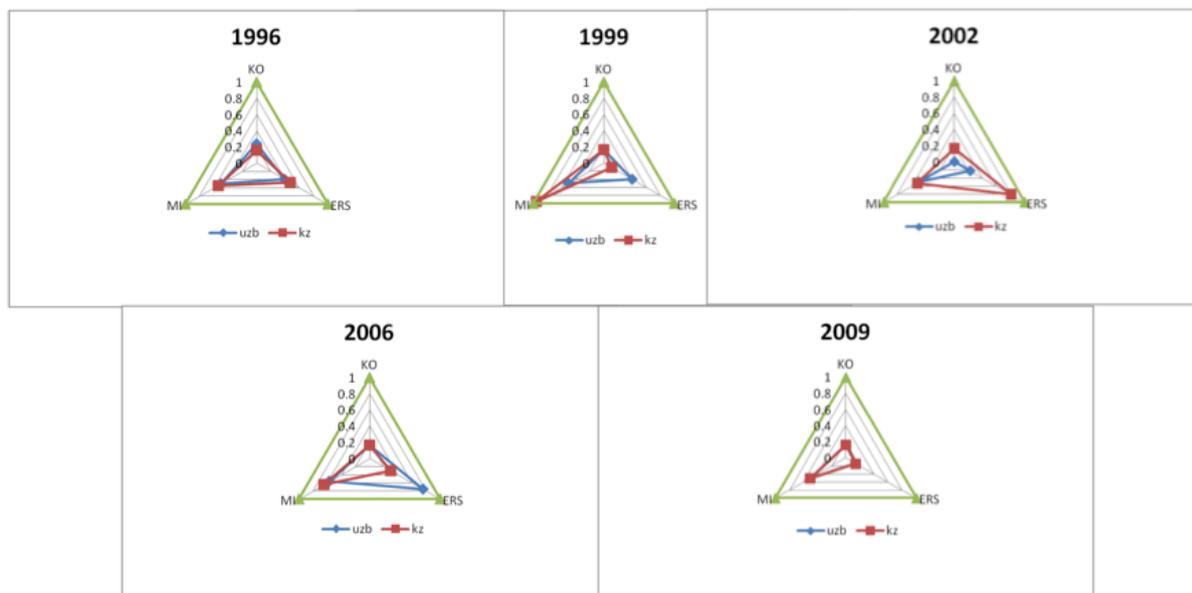


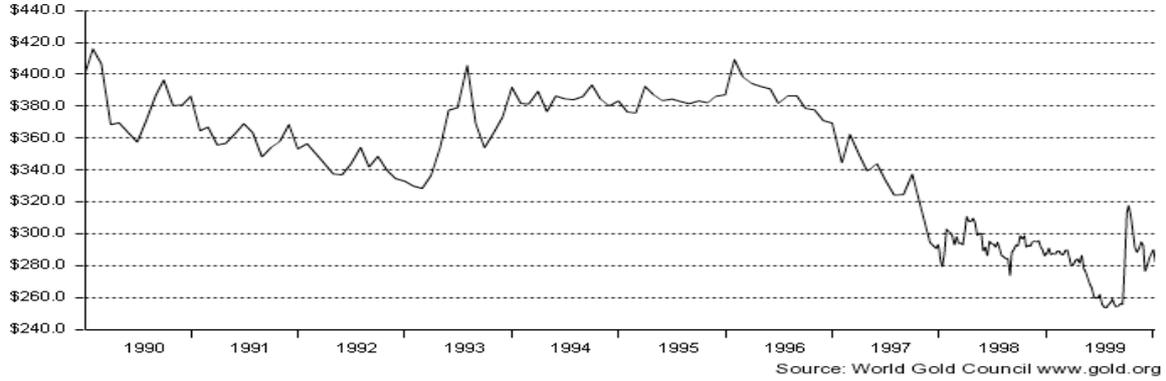
Figure 11 b) Trilemma Indices: Uzbekistan vs Kazakhstan, selected years.



**Figure 12. World Gold Prices**

a) 1990-1999

Spot gold price in USD



Currencies: USD  
Weight: oz

b) 2000-2005

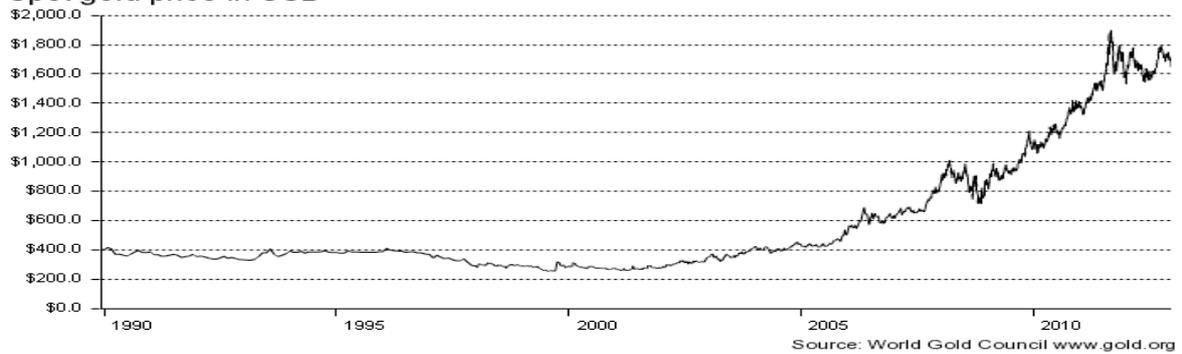
Spot gold price in USD



Currencies: USD  
Weight: oz

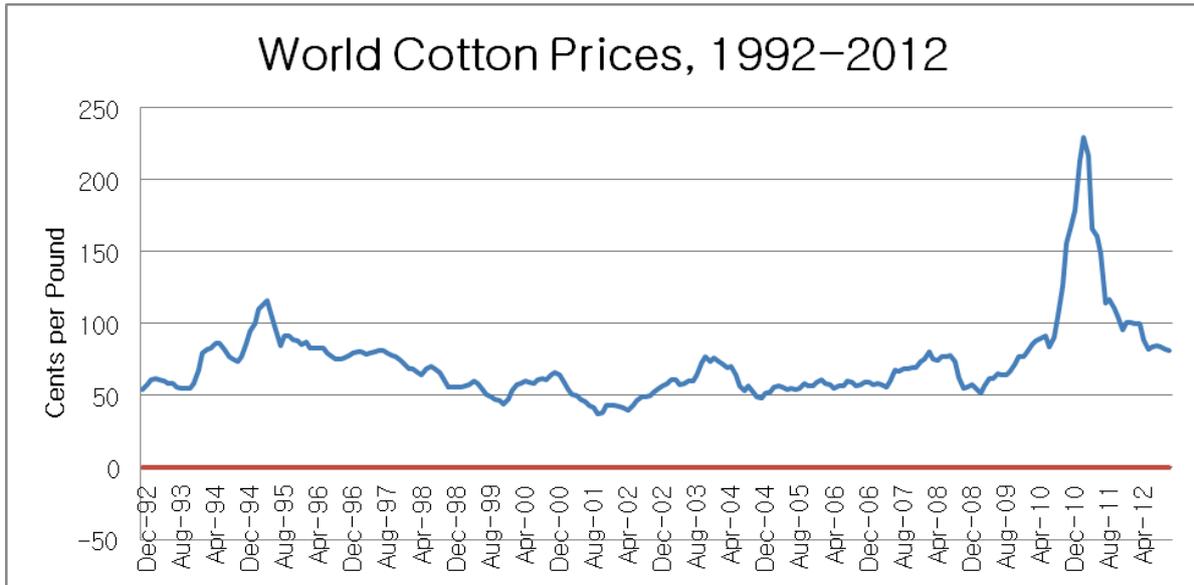
c) 1990-2012

Spot gold price in USD



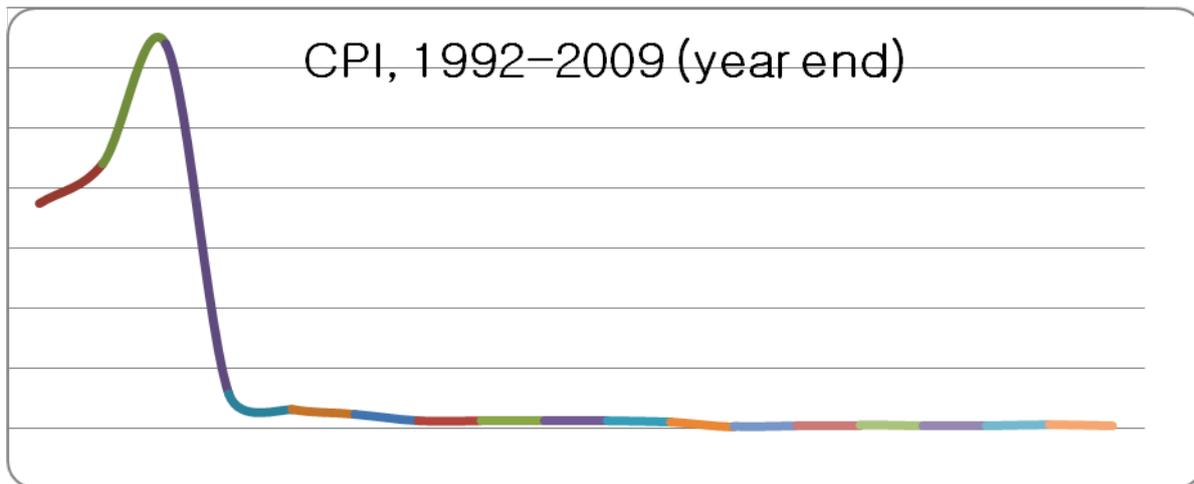
Currencies: USD  
Weight: oz

**Figure 13.** World Cotton Prices



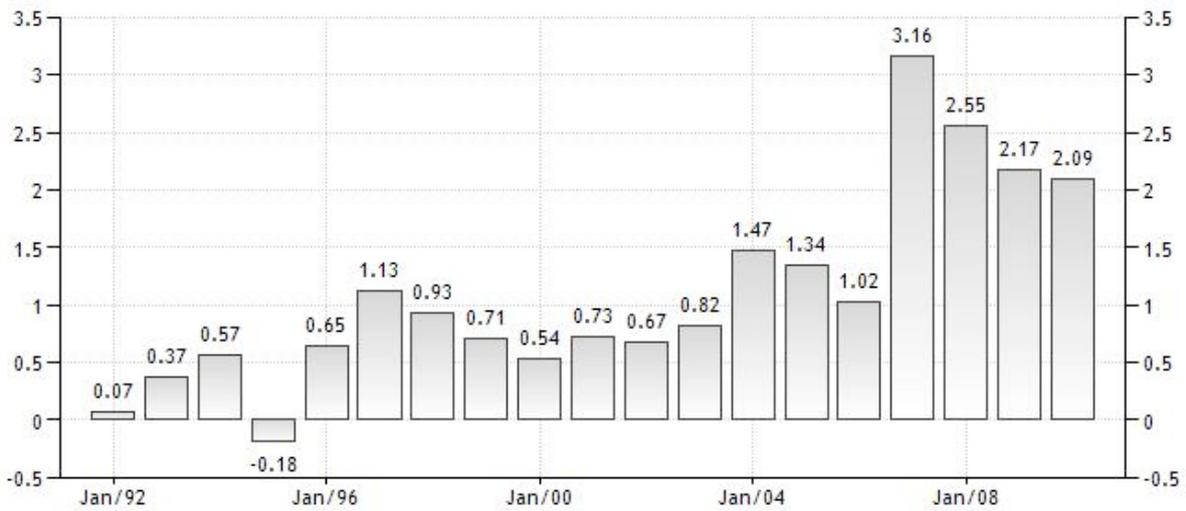
Source: IndexMundi. (Currency: USD, Weight: oz)

**Figure 14.** Consumer Price Index, 1992-2009 (year end)



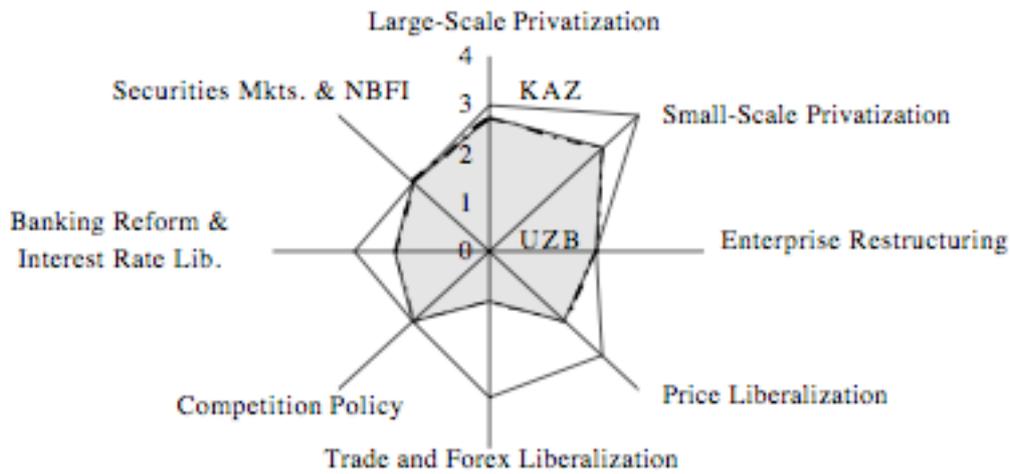
Source: EBRD

**Figure 15.** Foreign direct investment; net inflows (% of GDP) in Uzbekistan, 1992-2010 (year end)



Source: TradingEconomics

**Figure 16.** EBRD transition indicators compared, 1999



Source: EBRD 1999 Transition Report quoted in Alam & Banerji (2000)

## Tables

**Table 1.** Uzbekistan: Inter-republican trade balance, selected items, 1988 (mln. rubles)

Country	Population (mln)	Poverty (%)	Terms of Trade	*Share of industry in GDP, 1990	Natural Resource Endowment
Kazakhstan	16.8	15.5	+19	34.0%	Rich
Kyrgyzstan	4.4	32.9	+1	40.0%	Poor
Tajikistan	5.3	51.2	-7	34.0%	Poor
Turkmenistan	3.7	35	+50	34.0%	Rich
Uzbekistan	20.5	43.6	-3	33.0%	Moderate

**Sources:** Pomfret (2000) & Ruziev *et al* (2007)

**Table 2.** Uzbekistan: Inter-republican trade balance, selected items, 1988 (mln roubles)

Electric Power	Oil and Gas	Chemicals	Machine building	Food Processing	Light Industry	Agriculture
-11	-349	-163	-1949	-649	1786	469

**Source:** Ruziev *et al* (2007)

**Table 3.** Correlation between Reserves, Broad-money (M3), Foreign Exchange Rate (1992-2009)

	RESERVE	M3	FX
RESERVE	1	-0.32179	0.77364
M3	-0.32179	1	-0.53906
FX	0.77364	-0.53906	1

**Source:** Data adopted from EBRD

**Table 4.** USSR: Labor Force by employment status per Republic, 1988 (%)

	Total Labor Resources	Employed Total	State enterprises	Collective farms	Private Activity	Students	Others
USSR	100	85	85	7	3	8	8
RSFSR	100	86	80	5	2	7	7
Ukraine	100	86	72	12	2	7	7
Belorussia	100	87	74	11	1	7	6
Estonia	100	85	76	8	2	7	8
Latvia	100	87	76	9	2	7	7
Lithuania	100	86	73	10	2	8	7
Moldavia	100	87	67	13	7	7	6
Georgia	100	88	74	8	6	7	5
Armenia	100	81	70	3	8	8	12
Azerbaijan	100	70	56	8	6	8	22
Kazakhstan	100	81	75	3	3	8	11
Turkmenistan	100	82	52	19	11	9	9
Uzbekistan	100	76	55	11	11	10	14
Tajikistan	100	77	53	11	14	10	13
Kyrgyzstan	100	80	62	9	9	10	11

Source: Cited in Johnson & Islamov (1991)

**Table 5.** List of papers by topic and scholars

Development Factors	Uzbekistan	Other Country Cases
Natural Resource Endowment	Pomfret (2000); Ruziev <i>et al</i> (2007)	
Historical heritage	Akimov & Dollery; Blackmon (2005); Zettelmeyer (1998)	Blackmon (2005); Zettelmeyer (1998)
Financial Liberalization	Akimov & Dollery	Akimov & Dollery
Government Policies	Akimov & Dollery	Akimov & Dollery
Exchange Rate Policies	Akimov & Dollery; Rosenberg <i>et al</i> (2001); Hespeler (2011)	
External factors	Pomfret (2000)	
Financial Trilemma		Hutchison <i>et al</i> (2010) Aizenman <i>et al</i> (2008)

## 국문 초록

개발도상국의 경제가 변천하는 과정에서 환율, 이율, 그리고 자본계정의 트릴레마(trilemma)를 어떻게 잘 다루느냐가 관건이다. 이 논문은 현대 가장 빠르게 성장하는 국가인 우즈베키스탄을 시계열적으로 트릴레마를 분석하고 국가의 금융개혁의 우즈베키스탄의 경제에 미치는 영향을 알아보았다. 특히 1991년 이후 우즈베키스탄 정부 주도하에 진행된 금융개혁은 1990년대 이후 무역과 통화정책을 수립하는데에는 실패한 것으로 나타나나 이것이 과도기라는 점을 감안할 때, 이 개혁이 우즈베키스탄 경제의 선진화에 많은 도움이 되고 올바른 방향으로 진행됨을 시사한다.

주요어: 금융 트릴레마(trilemma), 우즈베키스탄의 경제, 국제준비금, 외환 환율, 통화정책, 자본 통제

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