Department of Economic & Social Affairs

DESA Working Paper No. 147
ST/ESA/2016/DWP/147

February 2016

What can Uzbekistan tell us about industrial policy that we did not already know?

Vladimir Popov, Anis Chowdhury[a]

ABSTRACT

This paper discusses Uzbekistan's recent experience with structural shifts and industrial policy and the larger implications for existing theories of industrial policy. The paper has a particular focus on various industry policy instruments.

Two major hypotheses are discussed: (1) the hypothesis of Haussmann, Hwang and Rodrik (the more technologically sophisticated the export structure, the better for growth) and (2) the hypothesis of Justin Yifu Lin (export specialization should build on existing comparative advantages and not jump over the necessary technological stages).

JEL Classification: O14, O25, O4, O53

Keywords: Uzbekistan, economic growth, economic diversification, industrial policy, exchange rate policy, wages policy

a The paper reflects the views of the authors and not of the organizations with which the authors are affiliated. The authors are grateful to anonymous referees for their helpful comments; but the usual caveats apply.

CONTENTS

Typesetter: *Nancy Settecasi*

UNITED NATIONS
Department of Economic and Social Affairs
UN Secretariat, 405 East 42nd Street
New York, N.Y. 10017, USA
e-mail: undesa@un.org
http://www.un.org/en/development/desa/papers/

What can Uzbekistan tell us about industrial policy that we did not already know?

1 Introduction

Uzbekistan in the past 10 years has been a successful economy. It attained high growth (8%), low unemployment, reasonable macro-economic stability, low domestic and international debt and relatively low inequality. Of note are the structural shifts which occurred in the recent 25 years post-independence:

1. A decrease in the production and export of cotton (previously a mono culture), an increase in food production and the attainment of food self-sufficiency,
2. An attainment of energy self-sufficiency and becoming a net fuel exporter;
3. An increase in the share of industry in GDP and the share of machinery and equipment in industrial output, export. Point in case, a competitive export oriented auto industry was created from the ground up. In addition, in recent years, Uzbekistan promoted heavy chemical industries such as the production of synthetic fuel and polypropylene goods from natural gas.

This paper argues that Uzbekistan's achievements in development have been due to deliberate government policies rather than simply the result of economic liberalization reforms to conform to its factor endowments and/or the result of a natural comparative advantage. The paper acknowledges Uzbekistan's enjoyment of a favourable external environment; however, it attributes its rapid growth to reasonable macroeconomic stability and industrial policies. It begins with a brief discussion of industry policy and economic diversification in the post-Soviet States in Central Asia and Eastern Europe including Russia. The rest of the paper is organized as follows:

- Section III compares Uzbekistan's transition and economic performance vis-à-vis other post-Soviet States;
- Section IV discusses changes in the economic structure of Uzbekistan;
- Section V shows that the main instrument of Uzbekistan's industrial policy has been the under-valuation of the exchange rate;
- Section VI reflects on the issues of industrial upgrading - the dilemma of choosing "winning" industries in the context of the general debate about the nature of industrial policy, especially the hypothesis advanced by Haussmann, Hwang and Rodrik vis-à-vis that by Justin Yifu Lin;
- Section VII contains concluding remarks on the lessons learned from Uzbekistan's industrial policies and the lessons which Uzbekistan can benefit from vis-à-vis the experiences of successful East Asian countries, especially Singapore, in the attempt to upgrade industrial structures.

2 Industrial policy and economic diversification

Industrial structure is important for economic development. The Chenery (1960) hypothesis states that countries at similar levels of economic development should have similar patterns of resource allocation between sectors. But in theoretical models it is often assumed that there are externalities from industrialization and industrial export (Murphy, Shleifer & Vishny, 1989; Polterovich & Popov, 2004, 2005). There is growing evidence that countries which are more industrialized and countries with more technologically sophisticated industrial export are growing faster than others (Hausmann, Hwang & Rodrik, 2006; Rodrik, 2006).

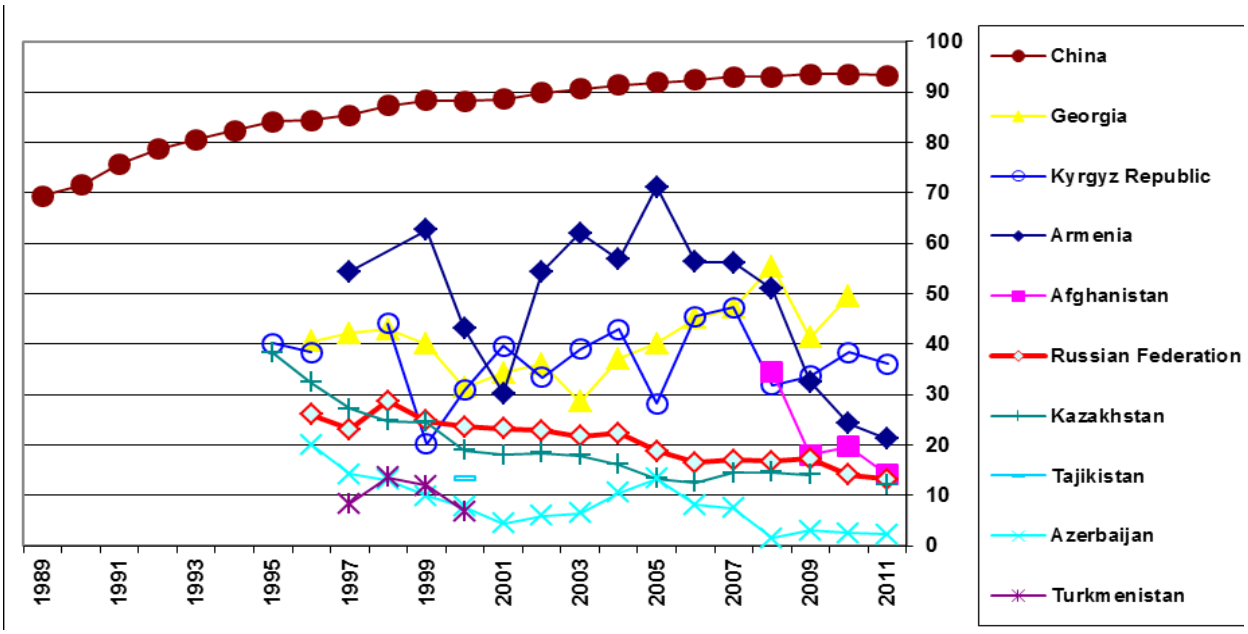
Not all countries are able to climb the technological ladder, diversify, and upgrade the structure of their economy and export. In most transition economies a "primitivization" of the industrial structure occurred.

In other words, secondary manufacturing and high tech industries proved to be uncompetitive and their output was curtailed after the deregulation of prices and the opening of the economy. As a matter of fact, an increase in the share of the service sector, especially trade and finance, at the expense of industry (deindustrialization) occurred in all post-communist economies. Previously in the centrally planned economies the service sector, in particular trade and finance, were underdeveloped. It seems, however, that in many of these economies deindustrialization went too far. In Tajikistan, for example, the share of services in GDP nearly doubled, increasing from about 30% in the early 1990s to 57% in 2010, whereas the share of manufacturing in GDP fell from 25% in 1990 to 10% in 2010. In Russia the share of industry in GDP fell from about 1/2 in 1990 to about 1/3 in the mid 1990s, whereas within industry itself the share of the primary sector (fuel, energy, steel and non-ferrous metals) in the total industrial output increased from 25% to over 50%.

The structure of exports in most post-Soviet states also became more primitive in the recent two decades; the share of manufactured goods in total exports either declined or did not show any clear tendency towards increase (fig. 1). This was partly caused by the increase in resource price and resource boom: expansion of fuel production and exports in Azerbaijan, Kazakhstan, Russia, and Turkmenistan. In Russia the share of fuel, minerals, metals and diamonds in total export grew from 52% in 1990 (USSR) to 67% in 1995 and 81% in 2012. In contrast, the share of machinery and equipment in total export fell from 18% in 1990 (USSR) to 10% in 1995 and 4.5% in 2012.

Such changes in the industrial structure were not solely the result of an "invisible hand of the market". Greenwald and Stiglitz (1986, 2013) state: market failures are pervasive, private rewards and social rewards virtually always differ. Governments, then, are inevitably involved in shaping the industrial structure of the economy, both by what they do and do not do. As many authors point out, the secret of

Figure 1
Manufactures exports, % of merchandise export



Source: WDI.

"good" industrial policy in East Asia, as opposed to "bad" industrial policy in the former Soviet Union, Latin America and Africa may be associated with the ability to reap the benefits of export externalities (Khan, 2007a; Gibbs, 2007). Exporting to world markets, especially to developed countries, enables the upgrading of quality and technology standards and yields social returns in excess of the returns to particular exporters. The greatest increases in productivity are registered at companies that export to advanced (Western) markets and which export hi-tech goods (Harris & Li, 2007; Shevtsova, 2012). In addition, it has been shown that the gap between the actual level of development and the hypothetical level, which corresponds to the degree of sophistication of a country's exports, is strongly correlated with productivity growth rates (Hausmann et al., 2006). In other words, it pays off to promote exports of sophisticated and high tech goods. Not all countries which attempt to promote such exports succeed, but those that do not try, virtually never engineer growth miracles.[b]

It is worth noting that there is an opposite view as demonstrated, for example, in a recent paper from the World Bank (Gill, et al, 2014). The paper concludes that it is not clear whether diversifying exports and production is necessary for development and that governments need concern themselves less with the composition of exports and the profile of production and more with their national asset portfolios—the natural resources, built capital, and economic institutions.

3 Uzbekistan's transition and economic performance

After the collapse of the USSR and the market oriented reforms in successor states the comparative performance in the post-Soviet space varied greatly (fig.2). In retrospect, it is clear that rapid economic liberalization did not pay off: many gradual reformers (labelled procrastinators at the time) from the former Soviet Union (FSU) performed better than the champions of big-bang liberalization (Baltic States and Central Europe). In Belarus, Turkmenistan and Uzbekistan, for instance, privatization was slow; over 50% of GDP is created in state enterprise (fig.3), yet their performance is superior to that of more liberalized economies. Recently when resource prices were high, resource abundance helped exporters such as Azerbaijan, Kazakhstan, Russia and Turkmenistan, to maintain higher income. However, this was not a sine qua non for growth; resource poor Belarus and self-sufficient in fuel and energy Uzbekistan did much better than resource rich Russia.

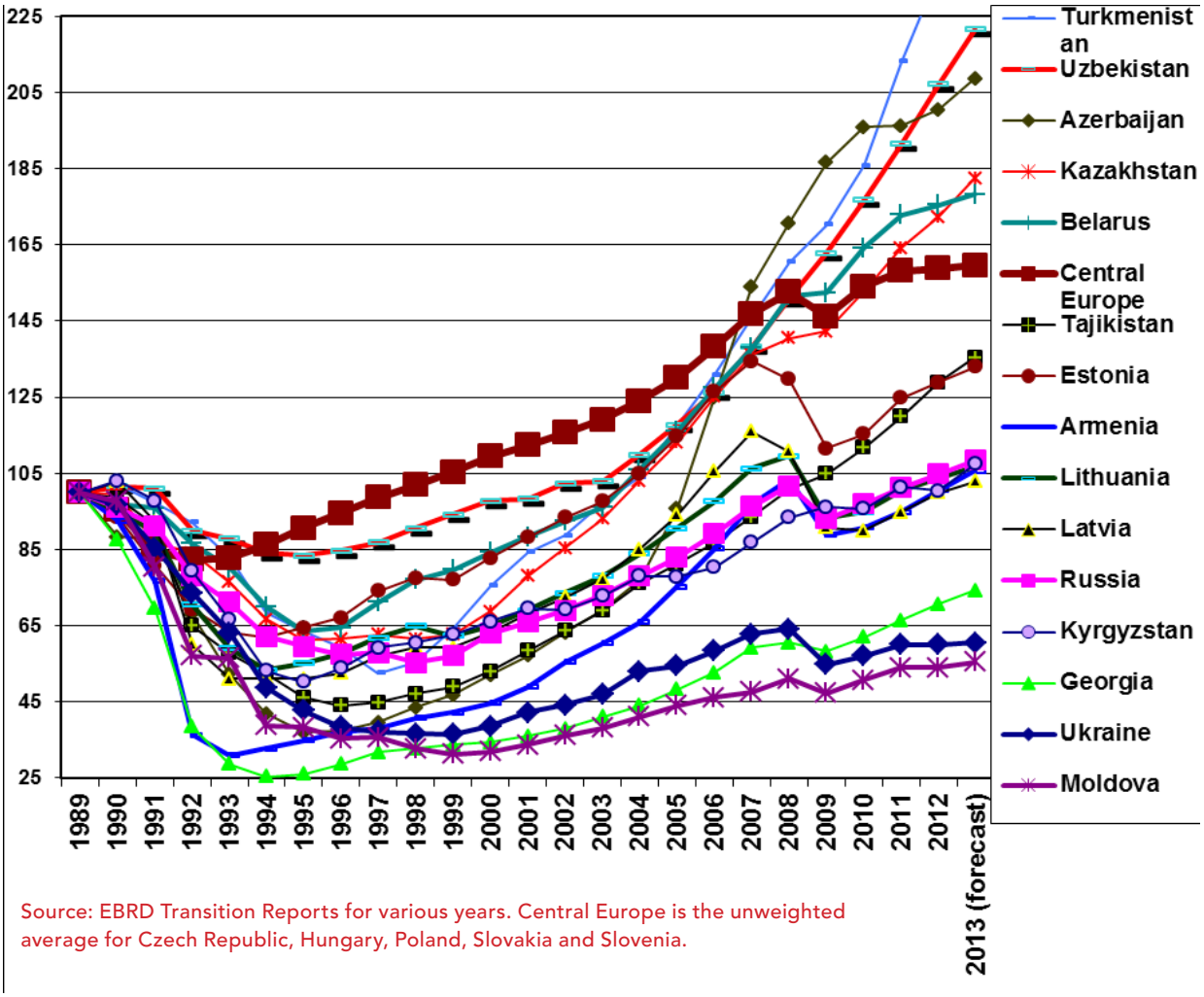
As recent research shows, the crucial factor in economic performance is the ability to preserve the institutional capacity of the state (see Popov, 2007, 2011 for a survey). The story of transition was very much a government capability, rather than a market failure. In all former Soviet republics and in the East European countries, government spending fell during transition and the provision of traditional public goods, from law and order to health care and infrastructure, worsened. This led to an increase in income inequalities, shadow economy, corruption, crime and mortality.[c] But in countries with the smallest decline in government spending (countries which are diverse in other respects – Central Europe,

b Botswana may be the only exception as it has one of the highest rates of per-capita GDP growth in the last 50 years (5% during 1960-2010), which was primarily driven by exports of primary commodities (namely, diamonds) and not of high-tech goods.

c State capacity is understood as the ability of the state to enforce rules and regulations and is measured by objective indicators such as crime rate, murder rate, the share of shadow economy, i. e. the degree of compliance with tax rules and criminal code (the murder rate is better than the crime rate due to statistical registration problems, see Popov, 2008).

There are well known problems with subjective measures of institutional capacity, such as corruption perception indices of Transparency International and the World Bank indices of government effectiveness, rule of law, etc. (Khan, 2007b; Popov, 2011). The institutional capacity declined dramatically in the 1990s in many transition economies; all three traditional monopolies of the state (on violence, tax collection and issuance of currency) were undermined (Popov, 2004).

Figure 2
GDP change in FSU economies, 1989 = 100%



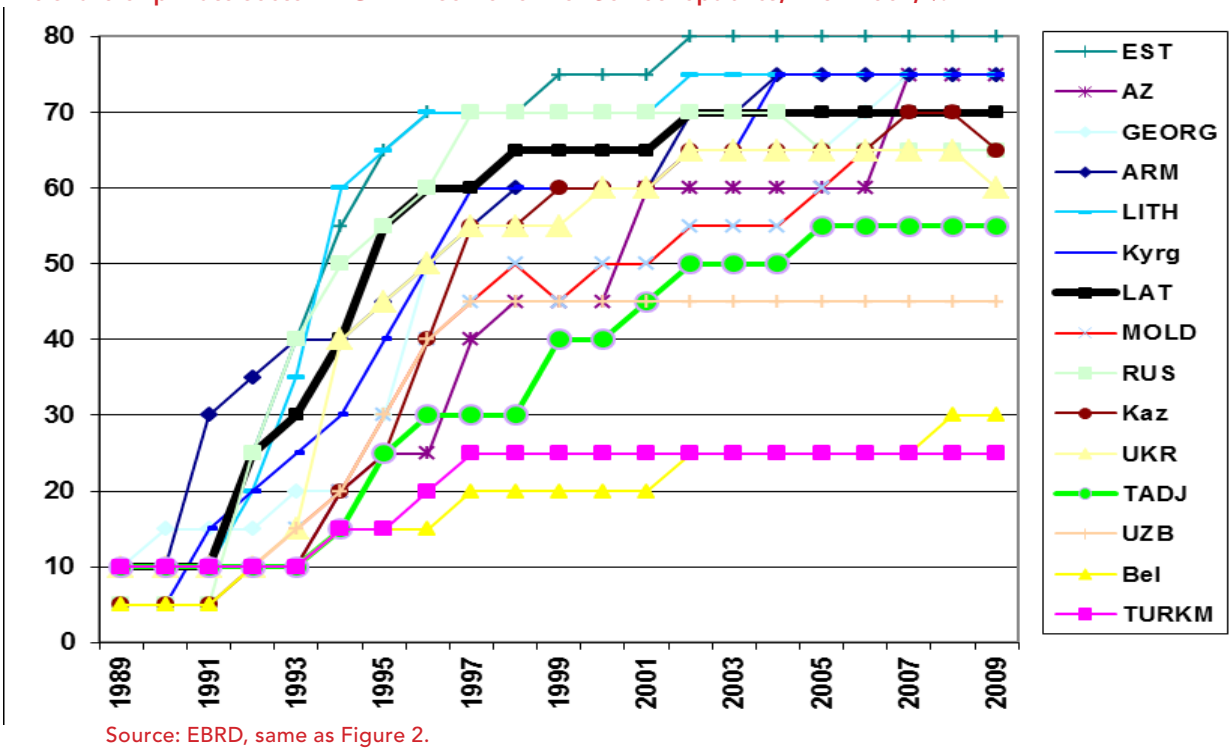
Source: EBRD Transition Reports for various years. Central Europe is the unweighted average for Czech Republic, Hungary, Poland, Slovakia and Slovenia.

Estonia, Belarus, Uzbekistan), these effects were less pronounced and the dynamics of output was better.

Uzbekistan is an economic success story in the post-Soviet space. Its initial transition-stage recession was very mild as compared to other countries of the former Soviet Union: its GDP more than doubled in 1989-2012, a better result than even in Central European countries (fig. 2); its life expectancy, currently at 68 years, may have not increased much, but it did not fall as it did in other former Soviet republics in the 1990s; its population increased from 20 mln. in 1989 to 30 mln. in 2013; and its murder rate is low (3 per 100, 000 of inhabitants, a figure lower than in the US). In 2009 during the economic recession, only Kazakhstan and Azerbaijan showed higher economic growth rates than that of Uzbekistan, whereas most post-communist countries experienced a reduction of output.

Uzbekistan's performance is not as spectacular as that of China; nevertheless, it is exceptional for the post-Soviet space. This is partly due to a good external environment; Uzbekistan exports mostly commodities - cotton, gold and gas, which have experienced an increase in international prices during the past 2 decades. However, more important reasons are attributed to the good macroeconomic and

Figure 3
The share of private sector in GDP in some former Soviet republics, 1989-2009, %



Source: EBRD, same as Figure 2.

industrial policies. Uzbekistan is the only country in the post-Soviet space that succeeded in increasing the share of industry in GDP and the share of machinery and equipment in the total industrial output, and export. It created a competitive export-oriented auto industry from the ground up. In 2011, it became the 15th country in the world to launch a high speed train line (between Tashkent and Samarkand). The fast speed railway was extended to Bukhara and Karshi in August 2015. Now it runs a distance of 511 km in 3 hours; the train is made by the Spanish Talgo.

The inclusiveness of growth appears to be higher in Uzbekistan as well. In 2012, Uzbekistan's official estimates for the Gini coefficient was just above 30% (World Bank estimates for 2002-03 is 35-36%). This is lower than in most transition economies. Meanwhile, in the more liberalized economies of Russia, Lithuania, Georgia and Kyrgyzstan income distribution is noticeably more uneven, with Ginis ranging between 0.38 and 0.45 (appendix fig. 1).

Another indicator of income distribution is the number of billionaires.[d] The 2013 Forbes count placed Russia and Georgia ahead in billionaire-intensity (number of billionaires per $1 trillion PPP GDP),

d The statistics on the number of billionaires published by Forbes annually allegedly characterize income distribution at the very top of the wealth pyramid. The number of billionaires depends mostly on the total size of the country's GDP. Much less important is the per capita GDP. The relationship is non-linear:

Number of billionaires in 2007 = -0.9 + 0.367y – 0.0049y^2 +2.6Y^2, where

y – PPP GDP per capita in thousand $ in 2005,

Y – PPP GDP in 2005 in trillions.

N= 181, R2 = 0.95, all coefficients significant at 1% level.

Countries which exceed the predicted number of billionaires considerably (2 times and more) are: Canada, Israel, Germany, Spain, UK, India, Turkey, Saudi Arabia, Egypt, Hong Kong, Malaysia, Philippines, Brazil, Russia, Ukraine, Kazakhstan. In contrast, countries where the number of billionaires is considerably lower than predicted are Japan, China, most countries of Western Europe, Oman, Argentina, Romania, Czech Republic (Popov, 2014c).

followed by Ukraine, Czech Republic and Kazakhstan (table 1). Other former USSR countries do not have billionaires yet, although their PPP GDP is higher than that of Georgia. For example, Azerbaijan and Uzbekistan are supposed to have about 3 billionaires had they the same level of billionaire-intensity as Russia. But in fact, they do not.

The relatively successful economic performance is even more impressive given that Uzbekistan is not a major oil and gas exporter and that it is one of two (the other being Liechtenstein) double landlocked countries[e] in the world. It is important, however, to distinguish between growth rates and the level of per capita income. Uzbekistan remains a poor country with PPP GDP per capita of below $US 6000 in 2014 against over $20,000 in Russia and Kazakhstan, $17,000 in Azerbaijan and over $14,000 in Turkmenistan. Many Uzbeks are migrating to find jobs in Russia. The reverse is not true.

It is necessary to separate the effects associated with the dynamics of output from the effects of the terms of trade and financial flows. At the end of the Soviet period, in the 1980s, real incomes in Uzbekistan were about half of those in Russia. After the collapse of the USSR, real incomes in non-resource republics fell dramatically due to the change in relative prices; oil, gas and other resources became several times more expensive relative to ready made goods. Uzbekistan was a large importer of oil and its trade with all countries, including other Soviet republics, if recalculated in world prices, yielded a deficit of 9% of GDP (Soviet economy, 1990). To make matters worse, the collapse of the Soviet Union dried up financial flows from Moscow. In 1990, inter-budgetary transfers from the Union budget amounted to 31% of the revenues of the republican budget (Soviet Economy, 1991).

Hence, the sharp reduction of real incomes in the early 1990s was larger than the reduction of output and was primarily due to a poor external environment and circumstance, rather than policy and choice. However, the dynamics of real output, i.e. the physical volume of output (fig. 1) which is dependent on circumstances and policy, was better than in all countries of Eastern Europe and former USSR with the exception of Turkmenistan.

Table 1
Billionaires in former USSR, Eastern Europe China and Vietnam

	Number of billionaires	Total wealth	PPP GDP, 2012	Number per 1 trillion PPP GDP	Wealth of billionaires to PPP GDP, %
China	122	260.9	12471.0	9.8	2.1
Russia	110	403.8	3380.0	32.5	11.9
Ukraine	10	31.3	338.2	29.6	9.3
Kazakhstan	5	9.2	233.0	21.5	3.9
Czech Republic	4	14.0	277.9	14.4	5.0
Poland	4	9.8	844.2	4.7	1.2
Georgia	1	5.3	26.6	37.6	19.9
Vietnam	1	1.5	322.7	3.1	0.5
Romania	1	1.1	352.3	2.8	0.3
Uzbekistan	0	0.0	107.0	0.0	0.0

Source: Forbes billionaires list (http://www.forbes.com/billionaires/#page:1_sort:0_direction:asc_search:_filter:All%20industries_filter:All%20countries_filter:All%20states); WDI.

e Double landlocked countries are countries completely surrounded by other landlocked countries.

4 Changes in Uzbekistan's economic structure

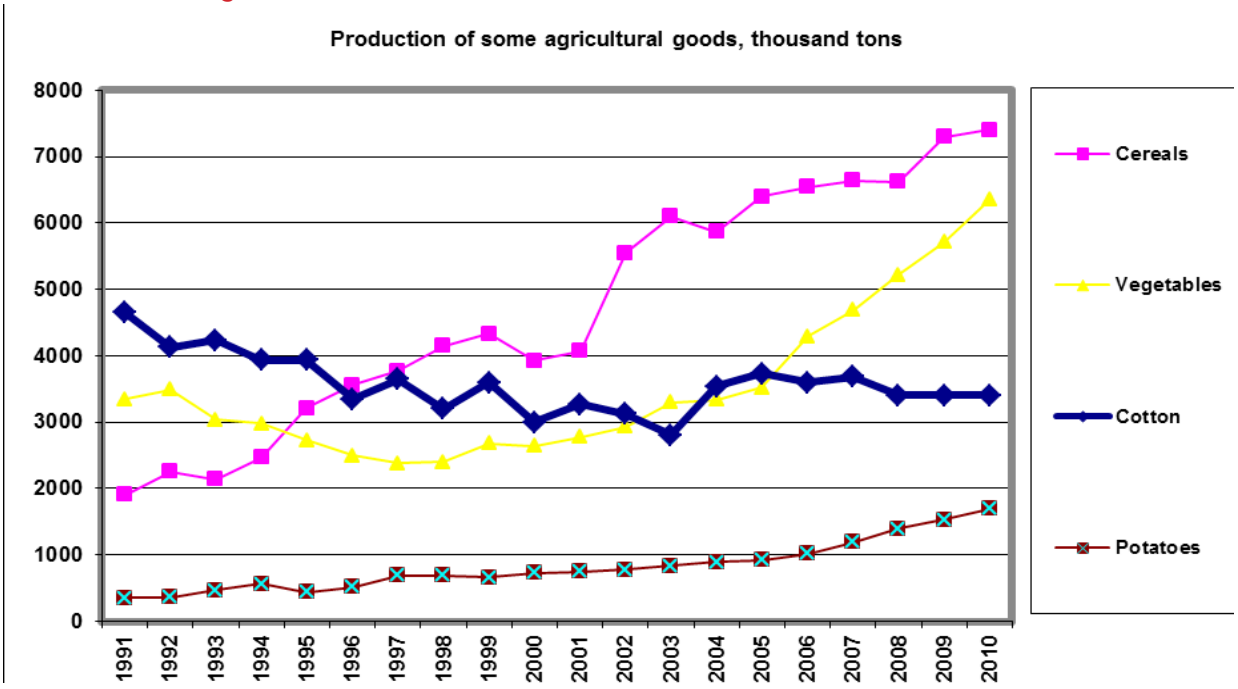
Since the 1991 independence, Uzbekistan encouraged and carried out three important structural shifts in its economy: (1) a decrease in cotton production and export and an increase in food production, achieving food self-sufficiency, (2) an attainment of energy self-sufficiency and an achievement of net fuel export, (3) an increase in the share of industry in GDP and the share of machinery and equipment in industrial output, export.

Diversification in agriculture was carried out mostly via state orders: less for cotton, more for cereals. Thus, the production of cotton decreased by 50% as compared to the late 1980s, and the output of cereals and vegetables increased several folds (fig. 4). The increase in gas output was due mostly to state investments: gas and oil are produced by the state holding company "Uzbekneftegaz". The diversification in industry and the expansion of manufacturing exports was mostly the result of protectionism and of the policy of low exchange rate by the government / central bank. Similarly to China, Uzbekistan maintained a low (undervalued) exchange rate due to rapid accumulation of foreign exchange reserves. In addition, there were non-negligible tax measures to stimulate the export of processed goods (50% lower tax rates for manufacturing companies that export 30% and more of their output).

Although comparable statistics from WDI for Uzbekistan is lacking, national statistics suggests that the share of non-resource goods in exports increased to over 70% against less than 30% in 1990, before independence (Foreign Affairs Department of Uzbekistan, 2013).

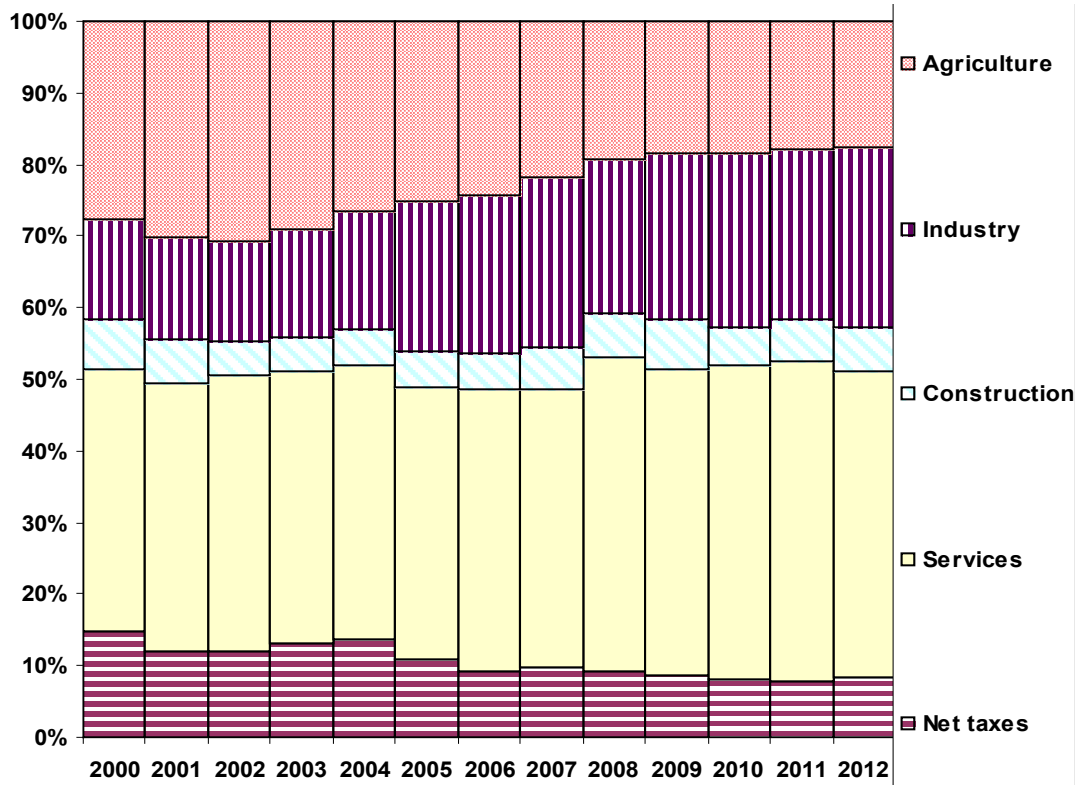
Uzbekistan is one of the few transition countries where the share of industry increased in recent years (fig. 5). It also was able to upgrade its structure of industrial output; the share of machinery, equipment and chemicals increased at the expense of light industry (table 2). Other post-Soviet economies also experienced the decline of light industry, but it happened together with the decline of machine building

Figure 4
Diversification in agriculture



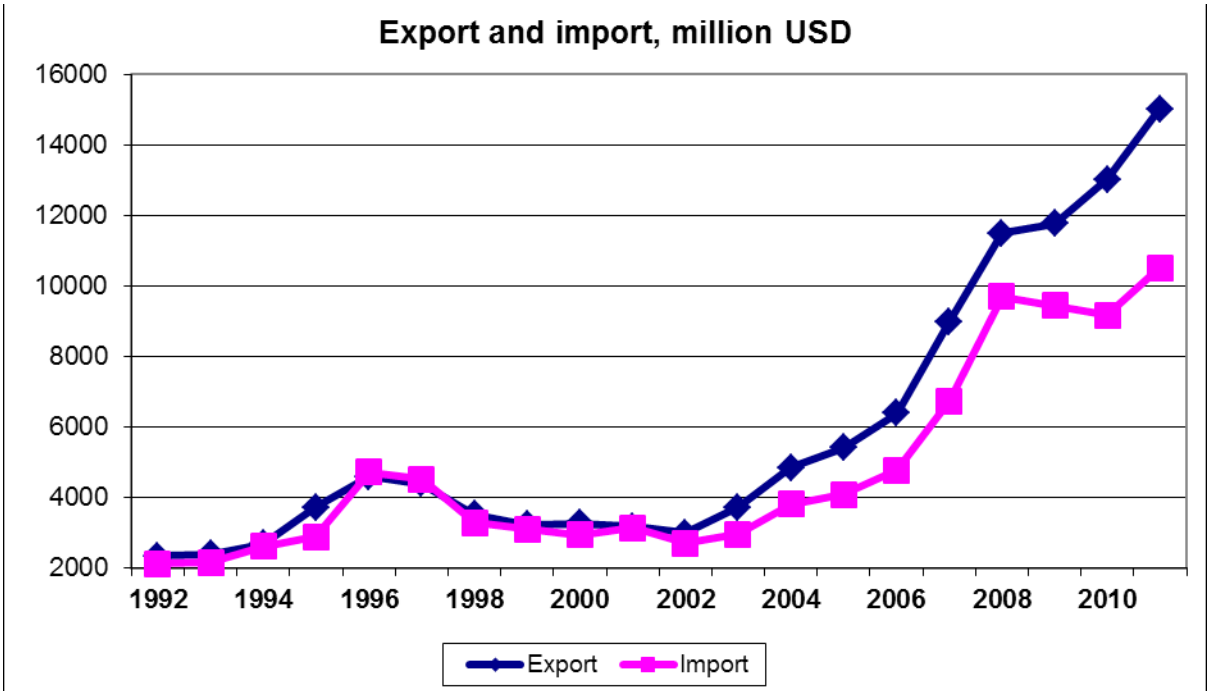
Source: State Committee on Statistics of Uzbekistan (http://www.stat.uz/en/)

Figure 5
GDP structure by sectors of the economy, % of total



Source: WB, 2013.

Figure 6
Export and import of Uzbekistan, million US dollars



Source: State Committee on Statistics of Uzbekistan (http://www.stat.uz/en/)

Table 2
Structure of industrial output in 1991 and in 2011 in current prices, % of total

Industry	1991	2011
Electric energy	2.7	8.0
Fuel	3.7	17.5
Steel	0.8	2.6
Non-ferrous metals	9.7	10.4
Chemical and petrochemical	4.0	5.5
Machinery and equipment	11.6	16.1
Wood, pulp and paper	1.6	1.1
Construction materials	4.3	5.3
Light	39.8	13.5
Food	14.8	14.0
Other	7.1	6.1
Total	100.0	100.0

Source: State Committee on Statistics of Uzbekistan (http://www.stat.uz/en/)

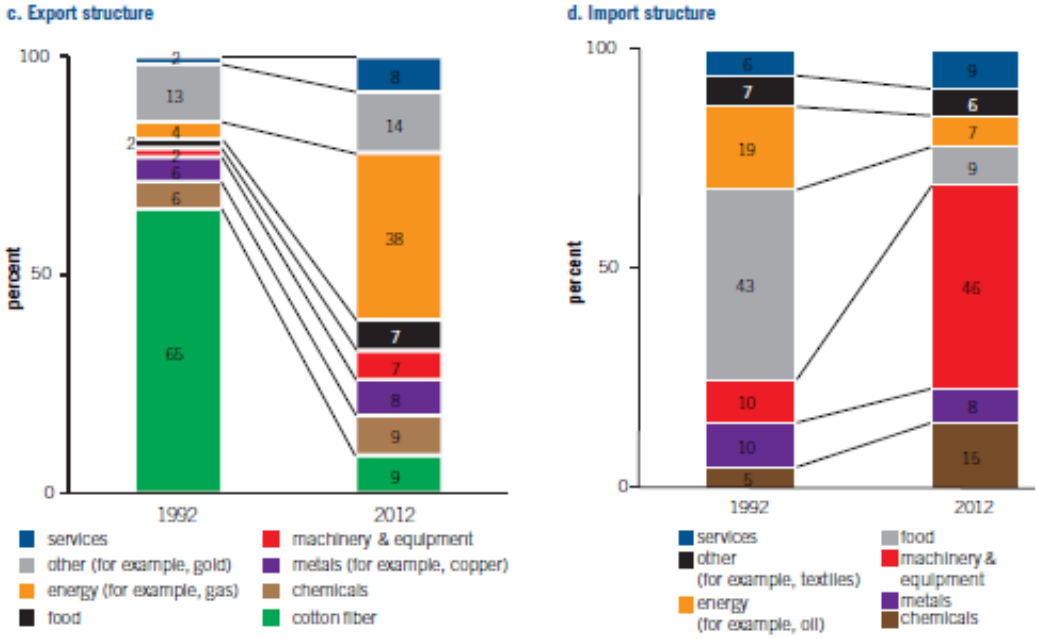
that created space for the expansion of fuel, energy, steel and non-ferrous metals. During the Soviet era, in a centrally planned economy, resource rent was removed from resource industries and given to secondary manufacturing through the pricing mechanism; prices for commodities and low processed goods were set at levels below the world marker, whereas prices for finished goods were established at an artificially high level. Once prices were allowed to be determined by the market after the deregulation in 1992, they got closer to the world levels and terms of trade for resource industries improved, but deteriorated for the secondary manufacturing.

After independence, an automobile industry was created in Uzbekistan from the ground up. Car production was supported by the government and the Korean auto company Daewoo. After Daewoo declared bankruptcy, US General Motors became the government's partner. The government also bought a stake in Turkey's Koc in SamKochAvto, a producer of small buses and lorries. Afterwards, it signed an agreement with Isuzu Motors of Japan to produce Isuzu buses and lorries. In 2014 Uzbekistan produced 250,000 cars and nearly a quarter were exported.[f] In 2011 a joint venture of State Auto Company and General Motors, the engine plant in Tashkent, became operational with a capacity of 360,000 engines a year.

Uzbekistan's exports increased dramatically: from $2 billion in 1992 to $15 billion in 2011, or from $100 to $500 per capita (fig. 6). The share of former USSR countries in exports fell from over 60% in 1992 to less than 40% in 2012 (appendix fig. 2). The share of cotton in export fell from 65% in 1992 to only 9% in 2012. The share of fuel (mostly gas) and oil products increased from 4 to 38%. The share of machinery and equipment increased from 2 to 7% and the share of chemical products from 6 to 9%. In imports the share of food fell from 43 to 10%, whereas the share of machinery and equipment increased from 10 to 46% (fig.7).

f In 2013 Uzbekistan sold over 60,000 cars to Russia and 33,000 to Kazakhstan. In 2014-15 export fell dramatically due to a recession in Russia. In 2014 car output was 246,000 including over 55,000 for export (38,000 to Russia, the rest to Kazakhstan, Azerbaijan, Ukraine, Belarus and also to Indonesia, Brazil, Turkey, South Korea). The share of joint venture company "GM Uzbekistan" in the Russian car market fell to 1.5% in 2014 from 2.2% in 2013 (UzDaily.uz, 2015 - http://www.uzdaily.uz/).

Figure 7
Commodity structure of export and import, % of total



Source: Trushin, Carneiro, 2013.

In recent years the second round of industrial policy focused on heavy chemicals: Shurtan Gas Chemical Complex and the planned production of synthetic liquid fuels based on purified methane together with South African "Sasol" and Malaysian "Petronas"; liquefied natural gas production at Mubarek gas processing plant; Dehkonobod Potash Fertilizer Plant; and Ustyurt gas chemical complex at Surgil deposit.

5 Undervaluation of the exchange rate – the main tool of industrial policy

In 2008-2012 Uzbekistan was growing at a rate of 8-9% with a barely visible decline in growth rates during the 2008-09 recession. It had a stable inflation of 7 to 8%,[g] a positive fiscal balance and rapidly declining debt to GDP ratio, a current account surplus and growing foreign exchange reserves. Foreign reserves for end of 2012 were estimated at about $40 billion (15 months of imports against 5 months in 2004), not including about $5 billion (2010) in the Reconstruction and Development Fund of Uzbekistan.[h]

However, here Uzbekistan is not exceptional. Many countries of the former USSR have managed to put their government finances in order in recent years and they enjoy budget surpluses, moderate

g Alternative estimate of the IMF marked inflation in 2012 at 11% (WB, 2013).

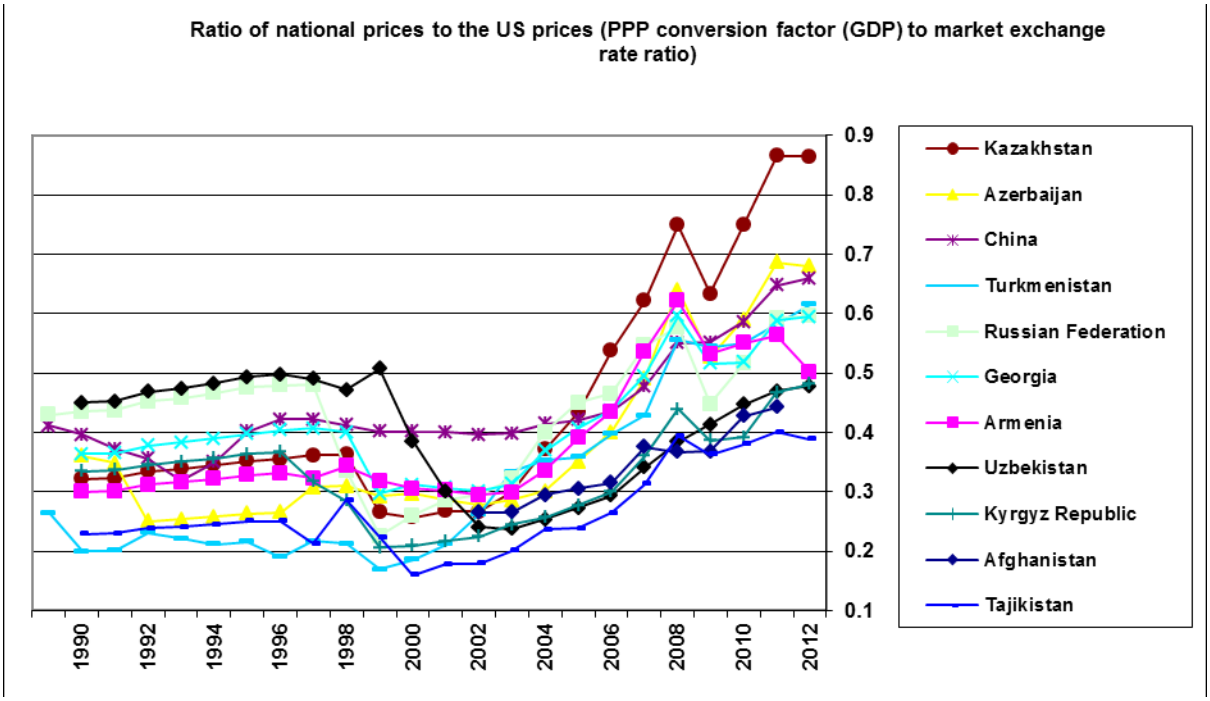
h In 2006, Uzbekistan's Fund for Reconstruction and Development (FRD) was established. It has been used primarily for sterilization and accumulation of foreign exchange revenues, but officially it was presented as a financial institution for providing government-guaranteed loans and equity investments to strategic sectors of the domestic economy. It was established by Uzbekistan's Cabinet of Ministers, Ministry of Finance and the five largest state-owned banks. The equity capital of the fund reached USD 5 billion in 2010. The FRD provides debt financing for modernization and technical upgrade projects in sectors that are strategically important for the Uzbek economy (energy, chemicals, non-ferrous metallurgy, etc.). All loans require government approval. The credit portfolio of the FRD reached USD 871 million in 2010 (BEEBA, 2011).

inflation and growing foreign reserves. What makes Uzbekistan different, even unique, is a policy of low exchange rate. This promotes export oriented development similarly to that seen in Japan in the 1950s-70s, South Korea in the 1960-80s and China and ASEAN countries since the 1990s (Dollar, 1992; Easterly, 1999; Polterovich & Popov, 2004; Rodrik, 2008; Bhala, 2012). Undervaluation of the exchange rate via accumulation of foreign exchange reserves, in fact, becomes a powerful tool of industrial policy, creating stimuli for tradable goods at the expense of non-tradables (Greenwald & Stiglitz, 2013). Former communist countries of Eastern Europe and the USSR did not carry out such a policy; on the contrary, their exchange rates were and often are overvalued, especially in countries that export resources (they suffer from the Dutch disease).

Since 2000, Uzbekistan is probably the only country in the post-Soviet space which carries out predictable and gradual nominal devaluation of the currency that is somewhat larger than needed to counter the differences in inflation rates between Uzbekistan and its major trading partners, so that real effective exchange rate depreciates slowly. The real exchange rate of the som versus the US dollar has somewhat appreciated, though not as much as the currencies of other countries (fig.8). However, the real *effective* exchange rate of the som (i.e. with respect to currencies of all major trading partners) decreased by over 50% in 2000-07. This is in sharp contrast with other transition countries of the region (North and Central Asia and Caucasus[i]) for which data are available (appendix fig. 3).

Exporters in Uzbekistan are required to submit half of their revenues in foreign currency at a rate that is considerably below the street value. The rationale behind this is the centralization of foreign currency earnings and import control; it allows the government to prioritize purchases abroad. The Reconstruction and Development Fund of Uzbekistan is now performing the role of both Stabilization Fund and Investment Fund (to finance imports for national projects).

Figure 8
Real exchange rate to the US dollar



Source: WDI.

i Afghanistan is the only non-transition economy in the region and is shown for comparison.

Other, more traditional tools of industrial policy also exist. For example, the tax stimuli to manufacturing exporters mentioned earlier, government orders and government investment. However, undervaluation of the exchange rate is probably the most important instrument.

6 Which industries should develop at a faster pace?

The reduction of the share of industry in GDP and the increase of the share of services is an objective process; but in the fast-growing countries (e.g., China), this decline was slower than in others (see appendix fig. 4). At the same time, it appears that the increase in the share of machinery and equipment in manufacturing output, as in China, usually accompanies rapid growth or even becomes the engine of growth. We are not aware of cases of rapid growth ("economic miracles") that are based on an accelerated growth of the service sector.

The question of "What are the particular manufacturing industries which could become the engine of growth?" is a difficult one. Unfortunately, economic theory does not suggest any definite clues, with the exception of the idea that these industries should have the highest externalities, i.e. their social returns should be higher than private returns. Yet, it is not easy to measure these externalities. Nevertheless, upon examination of the literature and the experience of countries with industrial policy, it is possible to isolate methods which can aid in our identification of industries that should be supported.

For example, one can support several industries which seem promising with the condition that assistance ends if the increase in export is not achieved within, for example, five years. This is called "EP-conEP" – effective protection conditional on export promotion (Jomo, 2013). Economic policymakers in this case are similar to the military commander who begins an offensive on several fronts, but throws reserves where there has been a breakthrough.

Alternatively, one can attempt to predict the specific industries where limited investment can give the greatest effect leading to the creation of globally competitive production. Most likely, these would be industries that lag behind in total factor productivity in the most advanced countries, but by less than other industries.

It is also possible to choose at random. In this case, it is important to be consistent by embarking on the path of support for a particular industry without withdrawal even if there is no immediate success or breakthrough in world markets. After all, the modern theory of international trade explains country specialization not by comparative advantages, but rather by "learning by doing".

If the country does not have any comparative advantage, similarly to post-war Japan for example, it is necessary to create them ("dynamic comparative advantages") by mastering the production of goods that have not been produced before. Supporting such production and consistently encouraging exports, without withdrawal for some time, is likely to have the learning by doing effect, allowing the country to gradually become competitive. As the saying goes, if Japan, which does not possess any minerals or extensive agricultural land, would rely on comparative advantages, its exports today would not even be sushi (which includes rice), but only sashimi.

There are two opposing views on how advanced in technology the industries supported in the framework of industrial policy ought to be. Justin Lin, former chief economist of the World Bank, developed the idea of comparative advantages following (CAF) and comparative advantages defying (CAD) industrial strategy. The best result, according to his argument, could be achieved if countries develop industries that are consistent with their comparative advantages, as determined by their endowment structure, and do not try to overleap necessary stages aiming at exporting the goods which are exported by very advanced countries (Lin, 2011).

This view is consistent with the "flying geese" paradigm: as more competitive countries move to more advanced types of export, the vacated niches are occupied by less developed countries. It is known that relatively poor countries began to export textiles and shoes, then moved on to the export of steel products

and heavy chemicals, then to the export of cars and electrical consumer products such as washing machines and refrigerators, then to consumer electronics and computers. In this case, the newcomers could benefit from the experience of other countries by trying to replicate their success.

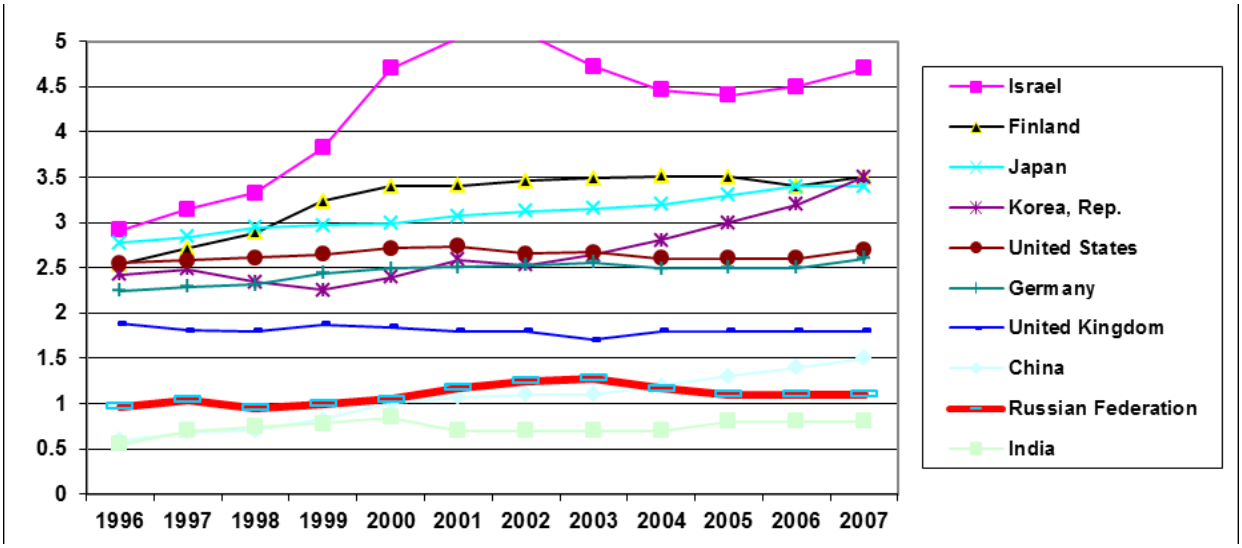
The transition from one exported good to the other could be dictated by the cycle of innovations. As Lee (2013) suggests, the cycle is short for electronics and long for pharmaceuticals and chemicals. This may explain why East Asian countries which focused mostly on industries with short cycles managed to avoid growth slowdowns while moving from one export niche to another.

Justin Lin believes that Uzbekistan should not leap over the consecutive stages by going from processing agricultural goods directly to auto and heavy chemistry industries. Lin suggests that Uzbekistan could gain greater benefits by developing less sophisticated industries such as food, textile and leather goods.[j] The arguments against, however, are supported by the examples of Israel and Finland who, at the end of the 20th century, mastered the production of high tech goods (electronics) and are now leading the world in the share of R&D expenditure to GDP ratio (fig. 9).

In contrast, Ricardo Haussmann, Jason Hwang and Dani Rodrik (Hausmann & Rodrik, 2006; Hausmann, Hwang & Rodrik, 2006; Rodrik, 2006) hypothesize that the more technologically sophisticated the export structure, the greater the stimuli for economic growth. China in 1992 and 2003 for example, had the greatest gap between the hypothetical per capita income as computed based on the technological sophistication of export structure, and the actual per capita income. That is to say, the structure of the Chinese exports was similar to that of countries with several-fold higher levels of economic development.

In another article (Hausmann & Rodrik, 2006) the process of transition from the production and export of one group of goods to the other is compared to the movement of monkeys in a forest from closer to more distant trees. The trees rich with fruit are far away, whereas closer trees do not have as much. Thus, the monkeys must compare the movement

Figure 9
R&D expenditure in selected countries, % of GDP



Source: WDI.

j Personal communication with Justin Lin. In the general form the theory is presented in (Lin, 2011).

costs with the benefits of reaching the more fruit abundant trees. Similarly to the monkeys, firms and society as a whole must compare the cost of mastering the new output and export (low for "nearby" industries which are close to existing technologies and high for "far away" industries with totally new technological processes) with the benefits (externalities) associated with developing particular industries (theoretically the higher, the more sophisticated these industries are).

It is worth noting that there was a similar debate between Justin Lin and Ha-Joon Chang (Lin, Chang, 2009). The latter was defending the idea of CAD industrial policy which favours industries that defy the country's comparative advantages. Such industries take time to develop, yet they could be worthwhile. For example, "…Japan had to protect its car industry with high tariffs for nearly four decades, provide a lot of direct and indirect subsidies, and virtually ban foreign direct investment in the industry before it could become competitive in the world market. It is for the same reason that the electronics subsidiary of the Nokia group had to be cross subsidized by its sister companies for 17 years before it made any profit. History is full of examples of this kind, from eighteenth-century Britain to late twentieth-century Korea" (Lin, Chang, 2009).

The difference between Chang's and Rodrik's position may be the subtle distinction between the CAD strategy and the policy to promote high tech industries and R&D in relatively poor countries. The CAD strategy does not necessarily imply a transition to more technologically sophisticated industries, but rather, to industries that are not linked to comparative advantages of a particular country. Theoretically, it could be a transition from chemicals to machine building with the same, or even lower, level of R&D intensity and technological sophistication. Rodrik's idea is that externality returns from the production and export of new products are proportional to the degree of their technological sophistication, which is measured by the comparison of export structures of rich versus poor countries. High income countries export on average more high tech products. Developing high tech production in poor countries may be costly, yet the returns from such a policy could be greater. It may well pay off for a relatively poor country to make "a big leap forward" by investing heavily in the education of the labor force and high tech industries, bypassing the intermediate stages of producing goods with medium research intensity. The implication for Uzbekistan is that investment in the auto and heavy chemistry industries could be well justified.

In the debate about "picking the winner", a distinction is made between functional and selective interventions (Lall 1994). While selective intervention refers to a policy package to create and support the "winners," functional interventions are those that remedy market failure without favouring any one activity over another. Thus, functional interventions can be termed as "corrective" industrial policy (CIP) and selective interventions as "directive" industrial policy (DIP). CIP is based on the premise that a properly functioning market economy provides an effective self-regulating mechanism for adapting to structural change. In relation to international trade, CIP rests on the principle of comparative advantage to determine the industrial structure. CIP, therefore, signifies a movement toward a more market-oriented open economy. To some extent, Lin's position can be placed within the CIP.

On the other hand, the intellectual origin of the directive approach can be traced to the work of Schumpeter (1934, 1939). DIP derives from the notion that structural change is a dynamic process which is typically discontinuous, disruptive and unbalanced. Thus, the position of Hausmann, Hwang & Rodrik can be placed within the tradition of Schumpeter and it fits the features of DIP.

7 Concluding remarks

a. Lessons from Uzbekistan

Uzbekistan created a car industry from the ground up. Today, this industry produces more than 200 thousand cars with their engines, half of which are

exported (Popov, 2014a). It is an undisputable success of industrial policy; a breakthrough to world markets with the products of a medium level research intensity, previously achievable only by countries of a higher level development. It remains to be seen, however, if the second round of industrial policy, with a focus on heavy chemistry, will succeed. The arguments against such a policy (Popov, 2014b) are more in line with Haussmann-Hwang- Rodrik's approach rather than Lin's approach.

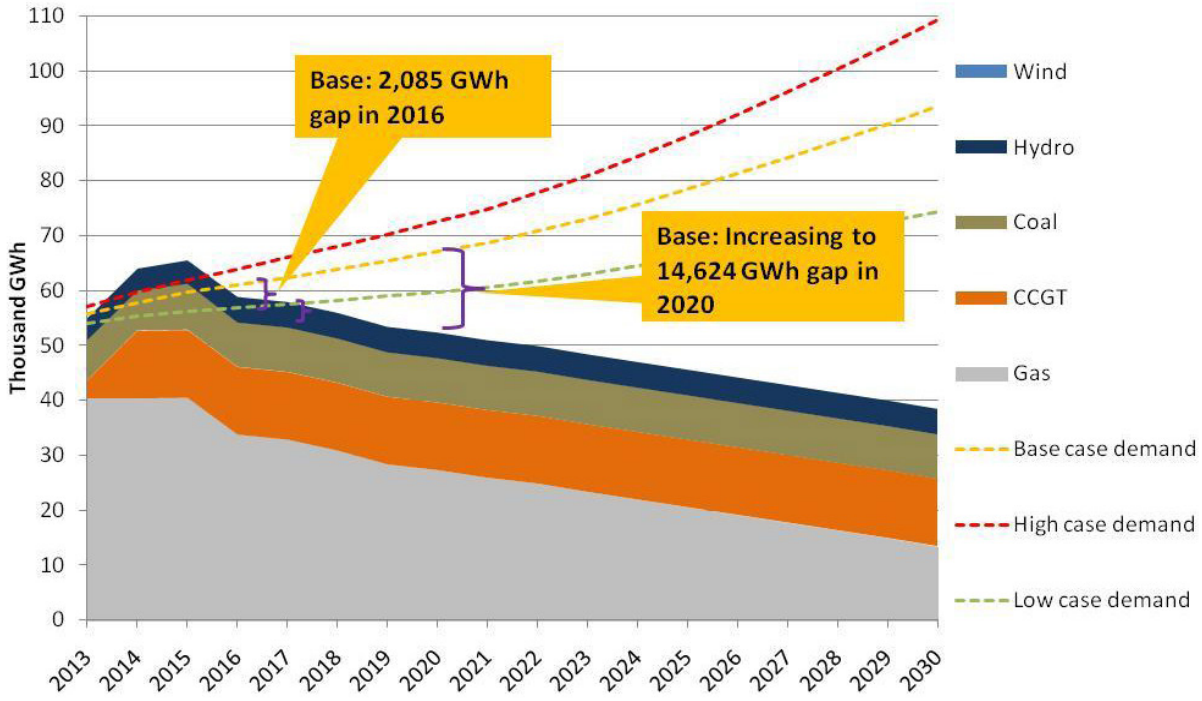
First, the gas reserves are close to depletion. It is projected that gas production will begin to decline as of 2015 (World Bank, 2013). In that case, the use of gas for the production of polypropylene and other chemical products will lead to a decrease in energy self-sufficiency. Currently, the country is a net exporter of fuel. If the World Bank forecasts are correct (fig. 10), Uzbekistan will have to import more oil and /or gas to satisfy domestic demand for energy. In addition, production of synthetic liquid fuels from gas will further reduce the already low capacity utilization at two existing refineries in Uzbekistan. Second, the focus on the development of heavy chemical industries can lead to a slowdown of growth or even a reduction of the level of TFP. Calculations by the Uzbek Institute of Forecasting and Macroeconomic Research (Chepel et al., 2014) reveal that the level of labour productivity and TFP, and the growth rates of these indicators in the past 10 years, were the highest in engineering, light and food industries, but not in petrochemicals and chemicals.

Third, the focus on medium tech engineering goods, the auto industry, has vindicated itself. Since it is a proven route, it might be better to develop successes in this area, and along these lines of specialization, rather than to attempt to create a new competitive industry from the ground up. The scale of the Uzbek economy may not be sufficient to specialize in more than one group of industries.

b. What can Uzbekistan learn from Singapore?

There is a general consensus that similar to East Asian economies such asSouth Korea and Taiwan, Singapore could break through in international

Figure 10
World Bank forecast of energy production & consumption in Uzbekistan till 2030



Source: World Bank, 2013.

competitiveness by ensuring a docile labour force and a market-driven flexible labour market. Although many see the depression of wages through subordination and attenuation of labour rights as purely an industrial relations matter, this in effect was a deliberate industrial policy which keeps the unit labour costs and the real exchange rate low.[k] Yet, it was the only alternative Singapore had when its monetary and exchange rate policies were constrained due to a currency board system in place until 1973. Even after 1973, Singapore's monetary system maintained the principles of a currency board. Singapore held net foreign reserves equal to about 100% of the monetary base and its monetary policy centred on the management of the exchange rate since the early 1980s. An undervalued real exchange rate, achieved through wage-depression, is an economy-wide policy and affects all industries equally. Thus, there was no need for picking the winners, although the government encouraged particular industries, such as petro-chemicals.

Singapore continued to use labour-market, in particular wage policies during the later phase, to restructure its industries by phasing out labour-intensive activities. However, it is obvious that at a later stage of development wage depression is not possible; wages must rise commensurate with the higher levels of per capita GDP. The symbiotic relationship between the union and the government helped Singapore's economy without union resistance. Being part of the policy-making process, trade union leaders understood the need for economic restructuring to remain internationally competitive. Trade union leaders also helped the government devise compensation packages and retraining programmes for workers who lost jobs due to restructuring. The government of Singapore introduced a Skills Development Fund (SDF) to collect levies from the "sunset" industries (low-skill, low-wage), thereby encouraging firms to retrain workers and making sure they remain employable. Employers were also required by law to contribute to workers' retirement funds. The government, by legislating compulsory employer contribution to the government-managed Central Provident Fund (CPF), has been able to create a sense of fairness in industrial relations. As the sunset firms exited under the pressure of rising costs, their workers did not fear losing their entitlements.

Finally, the tripartite wage-fixing mechanism at the national level accelerated the industrial restructuring process. By de-linking productivity-based wage increases at the enterprise level and adhering to the industry-wide average productivity-based wage increases, the system raised the unit labour cost of firms with below-industry-average productivity, thereby forcing them to exit. This also meant that firms with above-industry-average productivity enjoyed lower unit labour costs, hence higher profit rates for reinvestment.[l]

k See Chowdhury (2008) for industrial policies in East and Southeast Asia.

l See Salter (1960) for a formal analysis of productivity-linked wage increases and industrial restructuring. It is generally believed that wage increases according to productivity growth are noninflationary. This forms the basis for labour market deregulation or enterprise bargaining. However, as pointed out by Salter (1960), this adversely affects structural change as low-productivity industries would be able to continue operating while the high-productivity activities would lack incentive because their profit margin would remain stagnant. As a result, the overall economic growth would be low and inadequate for lowering the unemployment rate.

REFERENCES

BEEBA (2011). 2011 Investment Climate Statement – Uzbekistan. 2011 Investment Climate Statement. Bureau of Economic, Energy and Business Affairs. March 2011 (http://www.state.gov/e/eb/rls/othr/ics/2011/157382.htm).

Bhalla, Surjit (2012). Devaluing to Prosperity. Misaligned Currencies and Their Growth Consequences. Peterson Institute for International Economics, 2012.

Chenery, Hollis. (1960). Patterns of industrial growth. *American Economic Review*.

Chepel, S.V. et al. (2014) <Чепель С.В. и др. (2014). Расчеты совокупной факторной производительности по отраслям. Личная беседа, апрель 2014 г.>

Chowdhury, Anis (2008), "Labor Market Policies as Instruments of Industry Policy: What Can Europe Learn from Southeast Asia?", American Journal of Economics and Sociology, Vol. 67, No. 4 (October), pp. 661-681

Dollar, David (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. – *Economic Development and Cultural Change*, Vol. 40, No. 3, April 1992, pp.523-44.

Easterly, William (1999). The Lost Decades: Explaining Developing Countries Stagnation 1980-1998. World Bank, 1999.

EBRD (2012). Transition Report 2012. London, European Bank for Reconstruction and Development , 2012 (http://www.ebrd.com/pages/research/publications/flagships/transition/uzbekistan.shtml**).**

Forbes (2013). The World Billionaires. Forbes, http://www.forbes.com/billionaires/list/

Foreign Affairs Department of Uzbekistan (2013). Пресс-релиз Министерства иностранных дел Республики Узбекистан (http://mfa.uz/rus/pressa_i_media_servis/press_relizi/osnovnie_pokazateli.mgr)

Gibbs, Murray (2007). *Trade Policy*. UN DESA.

Gill, Indermit S., Ivailo Izvorski, Willem van Eeghen, Donato De Rosa (2014). Diversified Development. Making the most of natural resources of Eurasia. World Bank, 2014.

Greenwald, Bruce & Stiglitz, Joseph (1986). "Externalities in Economies with Imperfect Information and Incomplete Markets,"The Quarterly Journal of Economics, MIT Press, vol. 101(2), pages 229-64, May.

Greenwald, Bruce. Stiglitz, Joseph (2013). Learning and Industrial Policy: Implications for Africa. – In: Stiglitz, J., Lin, J., Patel, E. (Eds). The Industrial Policy Revolution II. Africa in the XXI century. IEA. Palgrave MacMillan, 2013.

Goskomstat (2015). Госкомстат (http://www.stat.uz/rows/)

Harris, Richard and Qian Cher Li (2007). Learning-by-Exporting? Firm-Level Evidence for UK Manufacturing and Services Sectors. Available at: http://www.gla.ac.uk/media/media_36279_en.pdf

Hausmann, Ricardo, Jason Hwang, and Dani Rodrik (2006). "What You Export Matters," NBER Working Paper, January 2006.

Hausmann Ricardo, Rodrik Dani (2006) Doomed to Choose: Industrial Policy as Predicament. Harvard University. September 2, 2006.

Jomo, Kwame Sundaram (2013). The best approach to economic development is pragmatism. In: 22 Ideas to Fix the World Conversations with the World's Foremost Thinkers, P. Dutkiewicz and R. Sakwa (eds), New York University Press, New York.

IMF (2008). Republic of Uzbekistan: 2008 Article IV Consultation—Staff Report; Public Information Notice on the Executive Board Discussion; and Statement by the Executive. IMF Country Report No. 08/235, July 2008

IMF (2012a). Uzbekistan: Staff Visit, May 21–25, 2012. Aide Memoire, 2012, http://www.imf.org/external/np/ms/2012/052512.htm

IMF (2012 b). Statement at the Conclusion of the 2012 Article IV Consultation Mission to Uzbekistan Press Release No. 12/475. December 7, 2012 (http://www.imf.org/external/np/sec/pr/2012/pr12475.htm)

Khan, Mushtaq (2007b). *Investment and Technology Policies*. UN DESA.

Khan, Mushtaq (2007a). Governance, Economic Growth and Development since the 1960s. DESA Working Paper No. 54, August 2007.

Http://www.un.org/esa/desa/papers/2007/wp54_2007.pdf

Lall, Sanjay (1994). "Industry Policy: The Role of Government in Promoting Industrial and Technological Development." UNCTAD Review 1994. Geneva: UNCTAD.

Lee, Keun (2013). Schumpeterian Analysis of Economic Catch-up
Knowledge, Path-Creation, and the Middle-Income Trap. Cambridge, 2013.

Lin, Justin Yifu (2011). From Flying Geese to Leading Dragons. New Opportunities and Strategies for Structural Transformation in Developing Countries. Policy Research Working Paper 5702. June 2011.

Lin, Justin and Ha-Joon Chang (2009). Should Industrial Policy in Developing Countries Conform to Comparative Advantage or Defy it? A Debate Between Justin Lin and Ha-Joon Chang. *Development Policy Review*, 2009, 27 (5): 483-502

Murphy, Kevin M., Andrei Shleifer, Robert W. Vishny (1989). Industrialization and the Big Push. – *The Journal of Political Economy*, Vol. 97, No. 5. (Oct., 1989), pp. 1003-1026.

Polterovich, Victor, and Vladimir Popov (2004) Accumulation of Foreign Exchange Reserves and Long Term Economic Growth. In *Slavic Eurasia's Integration into the World Economy*. Tabata, S., and A. Iwashita, eds. Slavic Research Center, Hokkaido University, Sapporo.

(http://www.nes.ru/%7Evpopov/documents/EXCHANGE%20RATE-GrowthDEC2002withcharts.pdf).

Polterovich, Victor, and Popov, Vladimir (2005). *Appropriate Economic Policies at Different Stages of Development.* NES (http://www.nes.ru/english/research/pdf/2005/PopovPolterovich.pdf.).

Popov, Vladimir 2004. The State in the New Russia (1992-2004): From Collapse to Gradual Revival? *PONARS Policy Memo* No. 342, Nov. 2004.

Popov, Vladimir (2007). Shock Therapy versus Gradualism Reconsidered: Lessons from Transition Economies after 15 Years of Reforms. - *Comparative Economic Studies,* Vol. 49, Issue 1, March 2007, pp. 1-31.

Popov, V. (2008). Getting better? Or getting worse? Murder rate under Putin. - *EURUS Newsletter*, Vol.25 (2) – Spring 2008.

Popov, Vladimir (2011). Developing New Measurements of State Institutional Capacity. *PONARS Eurasia Policy Memo No. 158*, May 2011. *MPRA Paper* 32389, August 2011.

Popov, Vladimir (2014a). An Economic Miracle in the Post-Soviet Space: How Uzbekistan Managed to Achieve What No Other Post-Soviet State Has. MPRA Paper No. 48723, posted 31 July 2013.

Popov, Vladimir (2014b). Can Uzbekistan Economy Retain Its High Growth Rate? Scenarios of Economic Development in 2015-30. - *PONARS Eurasia working paper*, December 2014.

Rodrik, Dani (2006). What's so special about China's exports? Harvard University, January. (http://www.hks.harvard.edu/fs/drodrik/China-exports.pdf)

Rodrik, Dani (2008). *The Real Exchange Rate and Economic Growth*. revised, October. (http://www.hks.harvard.edu/fs/drodrik/Research%20papers/RER%20and%20growth.pdf)

Salter, W. E. Graham (1960) *Productivity and Technical Change*. Cambridge University Press

Schumpeter, Joseph. (1934). The Theory of Economic Development. Cambridge: Harvard University Press.

Schumpeter, Joseph. (1939). Business Cycles. New York: McGraw-Hill.

Shevtsova Yevgeniya (2012). International Trade and Productivity: Does Destination Matter? *Discussion Papers in Economics* 12/18. Heslington: University of York.

Soviet Economy (1991). *A Study of the Soviet Economy*. IMF, World Bank, OECD, EBRD. 1991, Vol. 1, 2, 3.

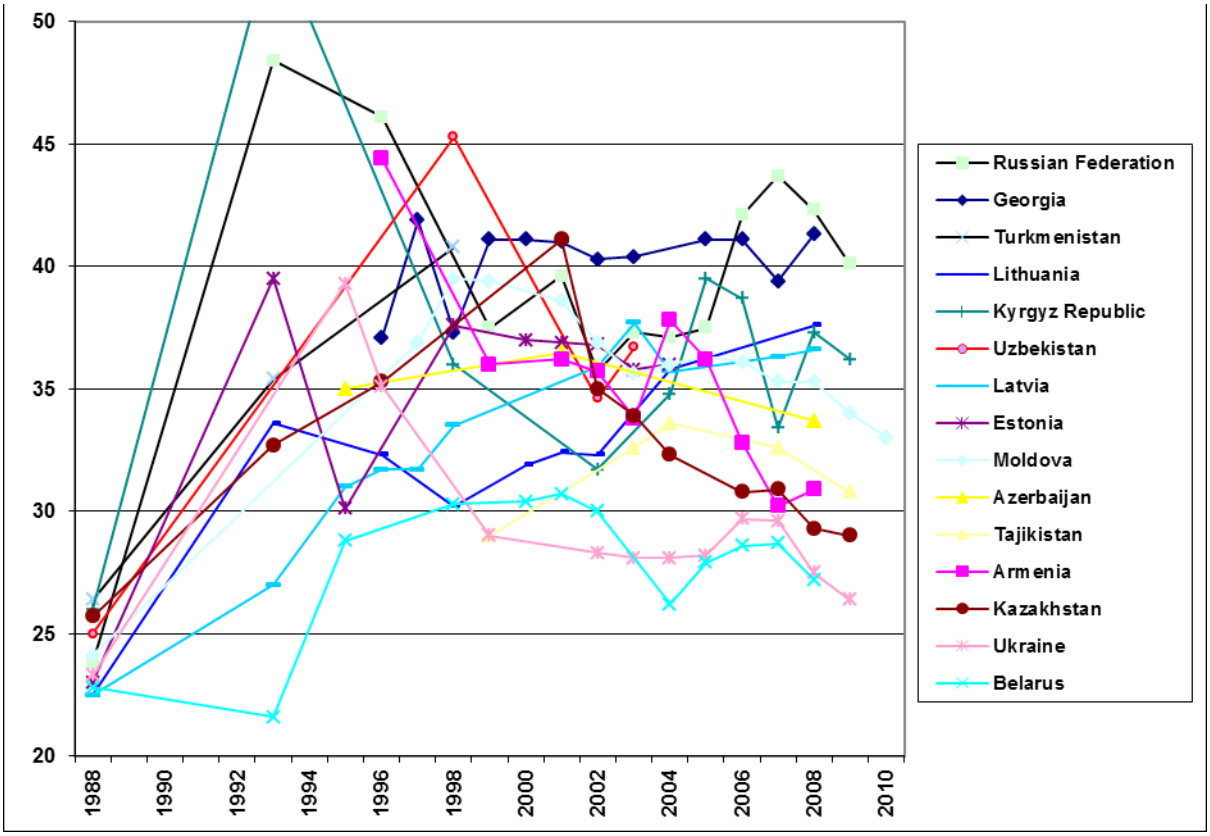
Trushin, Eskender and Francisco G. Carneiro (2013). Changing for the Better: The Path to Upper-Middle-Income Status in Uzbekistan. Economic Premise, No. 119, June 2013 (http://siteresources.worldbank.org/EXTPREMNET/Resources/EP119.pdf).

World Bank (2013). World Bank Group – Uzbekistan Partnership: Country Program Snapshot. March 2013 (http://www.worldbank.org/content/dam/Worldbank/document/Uzbekistan-Snapshot.pdf).

World Bank, WDI –World development Indicators database; (http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators).

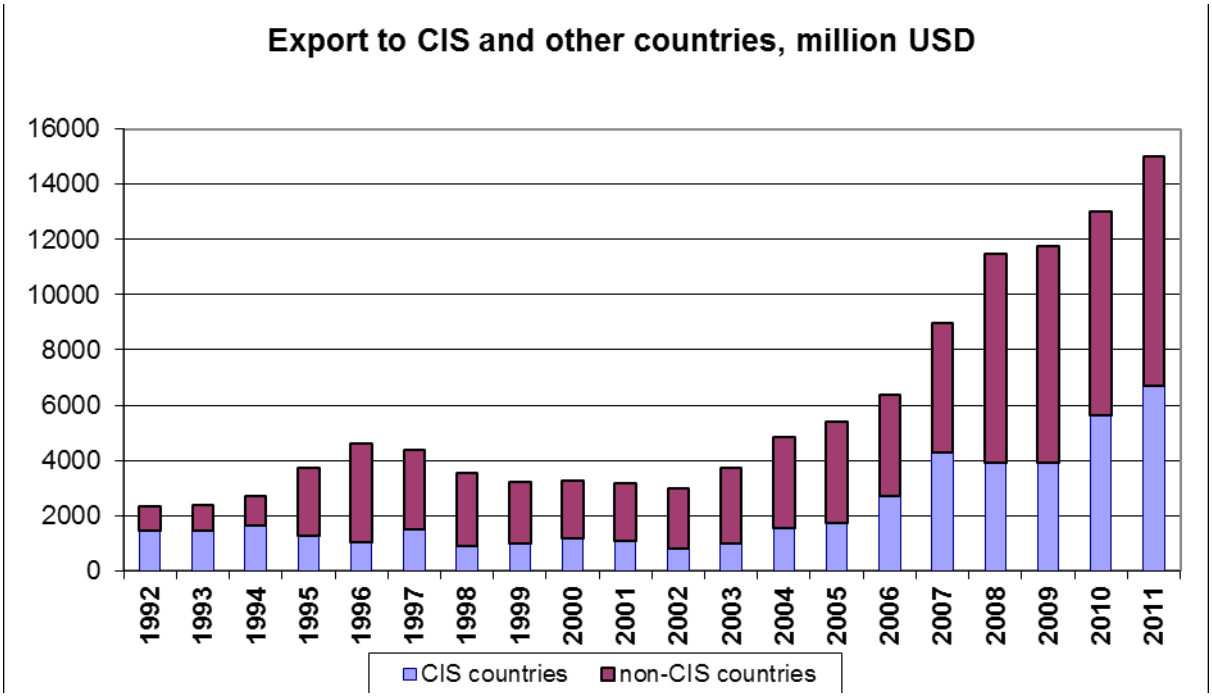
Appendix

Figure 1
Gini coefficient of income distribution in post Soviet states



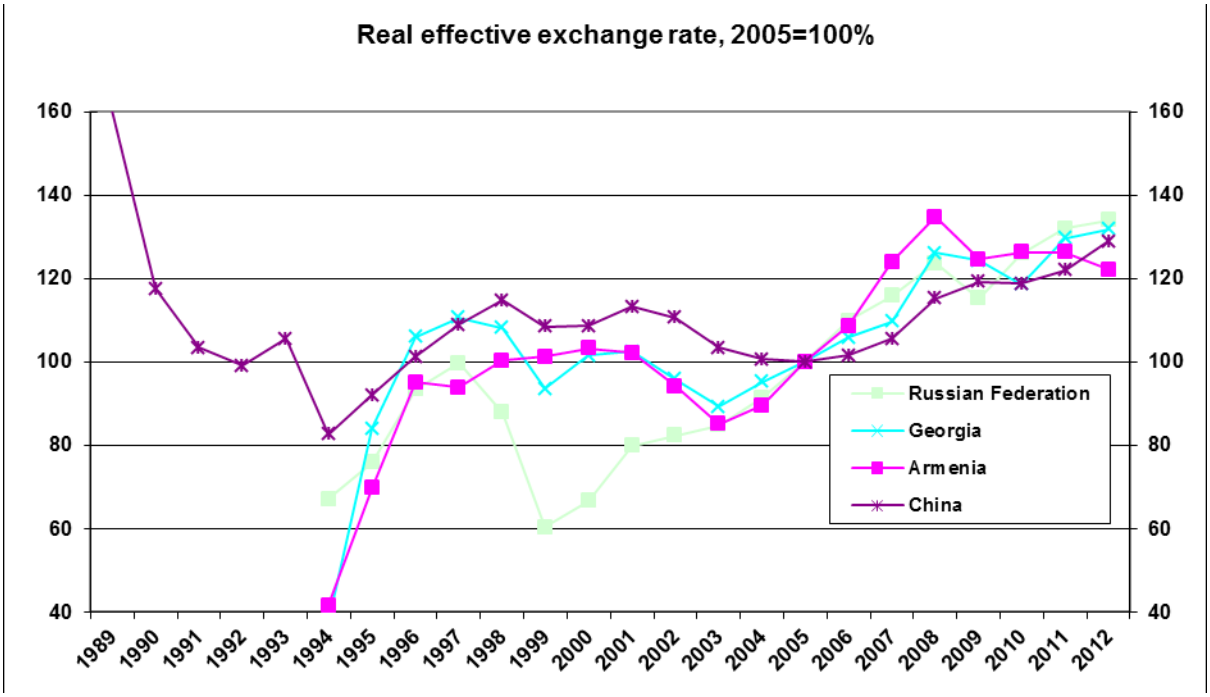
Source: WDI.

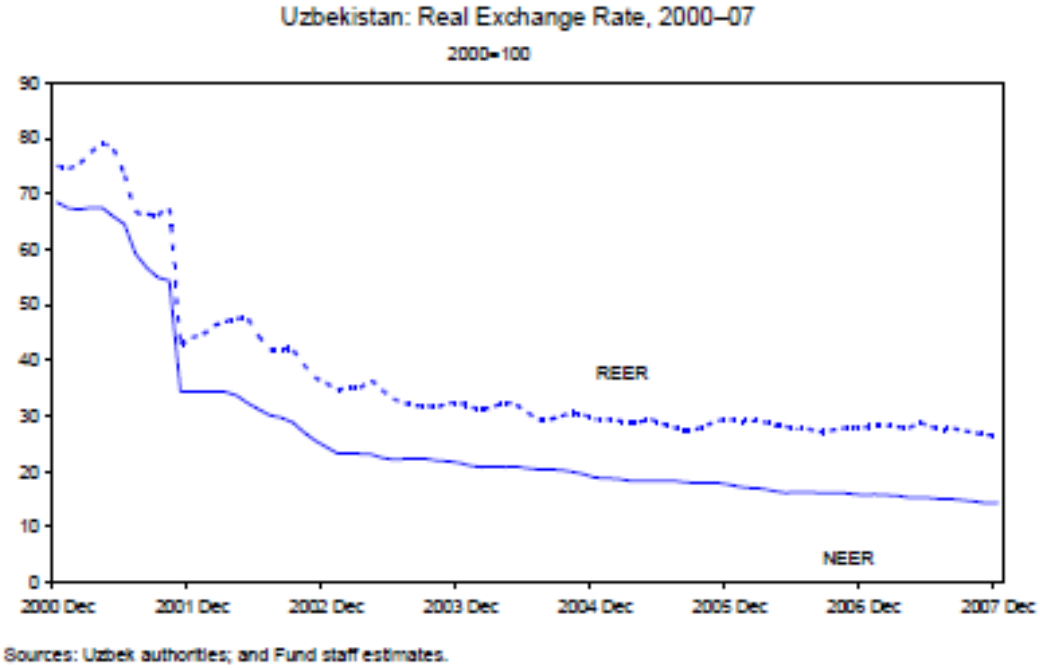
Figure 2
Export to CIS & other countries, million US dollars



Source: State Committee on Statistics of Uzbekistan (http://www.stat.uz/en/)

Figure 3
Real effective exchange rate of Uzbek som

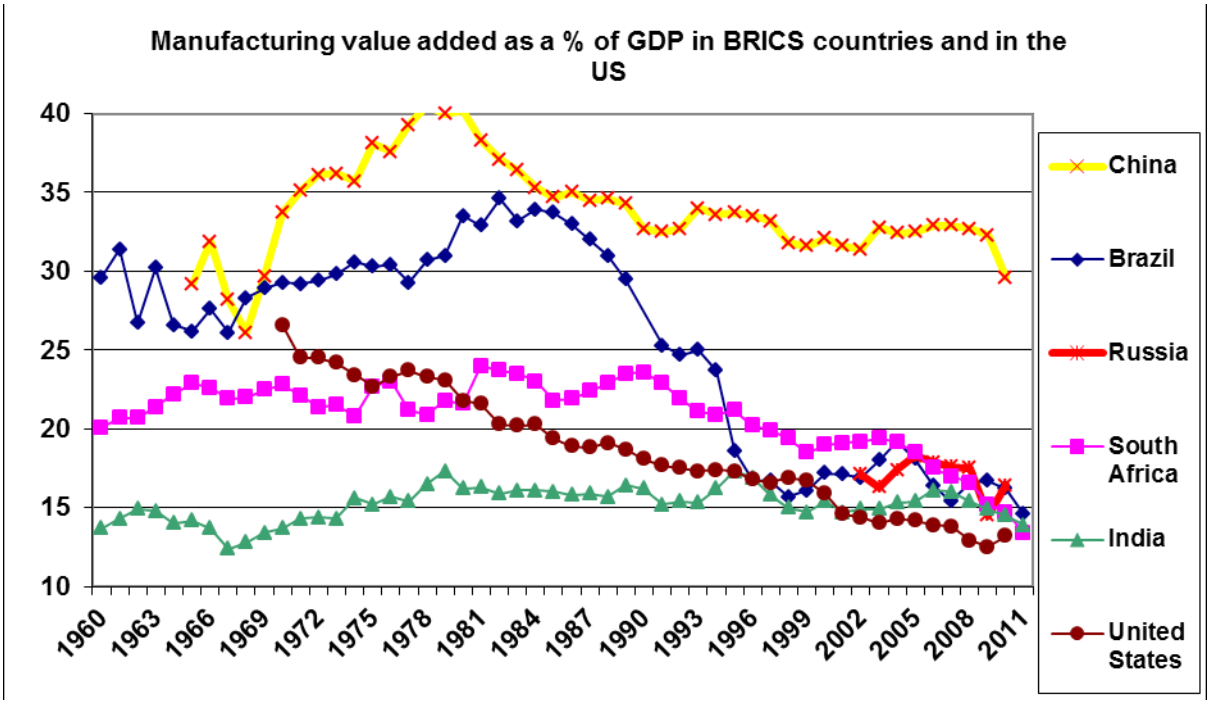


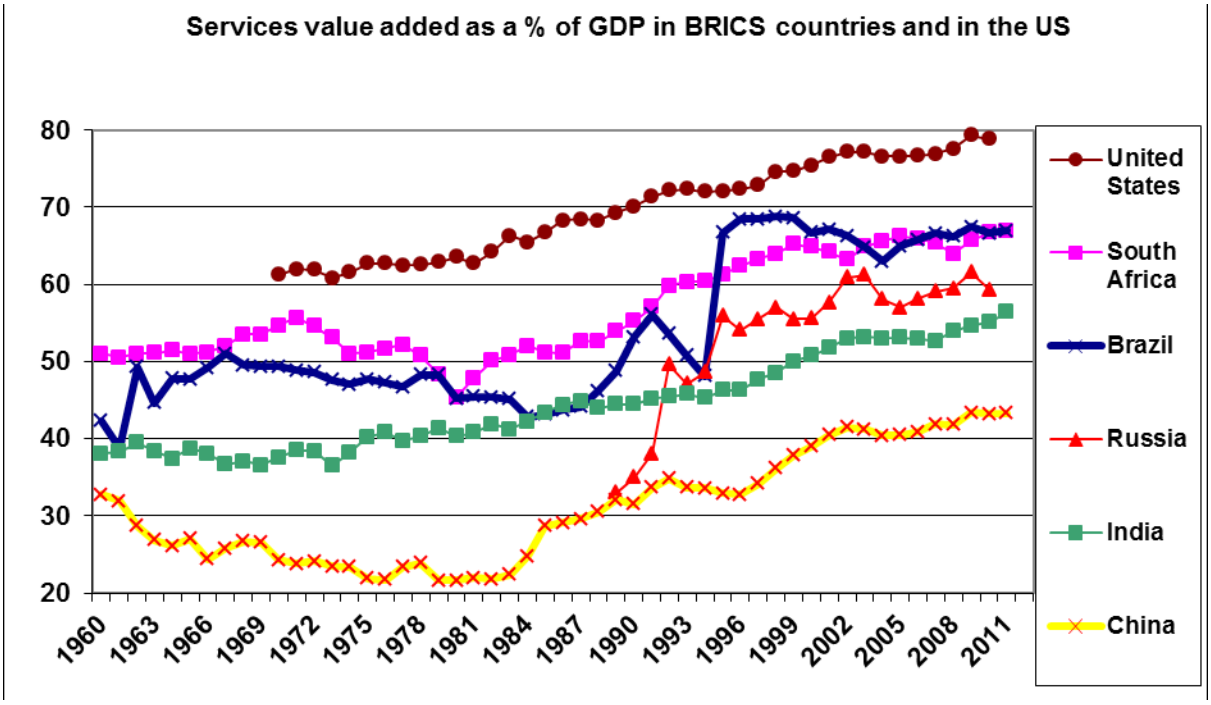


Source: WDI, IMF, 2008.

Figure 4

The share of manufacturing & services in GDP, the share of industry in employment, the share of machinery in manufacturing value added

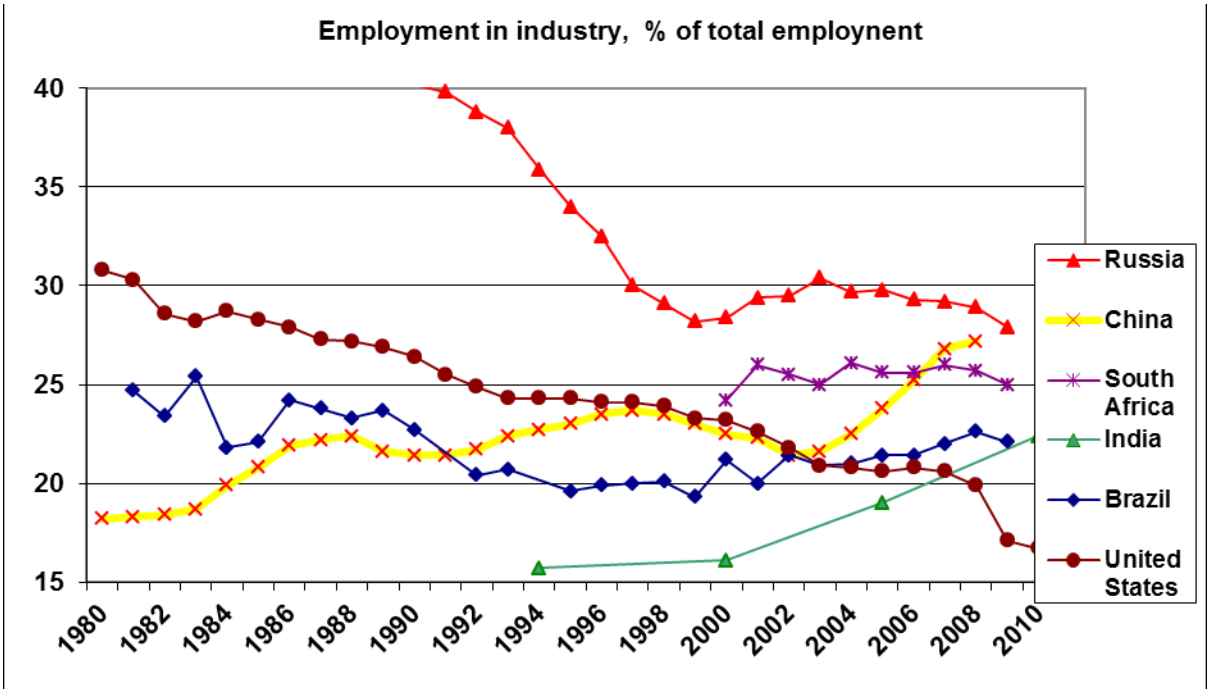


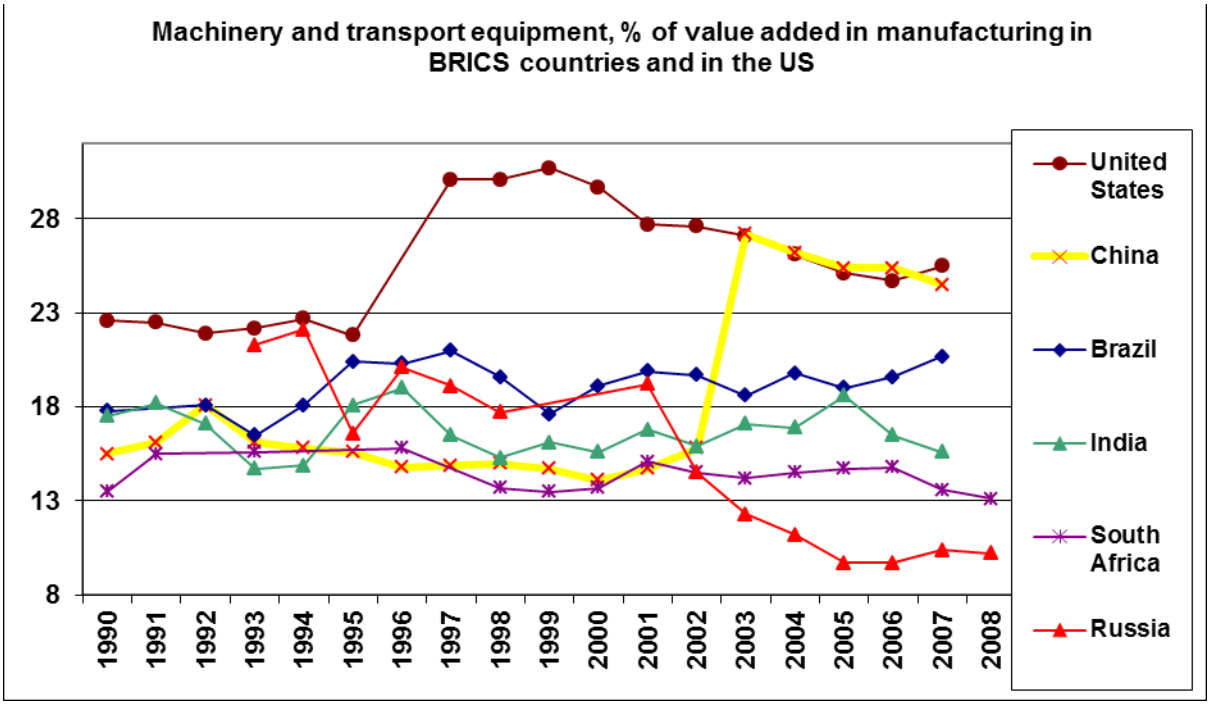


Source: World Development Indicators.

Figure 4 (continued)

The share of manufacturing & services in GDP, the share of industry in employment, the share of machinery in manufacturing value added





Source: World Development Indicators.