Can Uzbekistan's Economy Retain its High Growth Rate?
SCENARIOS OF ECONOMIC DEVELOPMENT IN 2015-30

By Vladimir Popov
New Economic School, Moscow

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ABSTRACT

Uzbekistan over the past ten years has had an extremely successful economy, with high growth rates (8%), low domestic and international debt, an undervalued exchange rate, a relatively even distribution of income, and a created-from-scratch, competitive, export-oriented auto industry. It is important, though, to avoid any "dizziness from success" and to envisage possible growth traps in its future. This paper discusses two unfavourable scenarios: trade shocks due to a decline in cotton, gas, and gold prices (e.g., a deterioration of its current account balance by 10 p.p. of GDP) and a decline in growth rates of total factor productivity (TFP). Also considered are the possible government responses to these potential negative occurances, in particular changes in the government's industrial policies.

In recent years, Uzbekistan has been promoting heavy chemistry industries (primarily the production of synthetic fuel and polypropylene goods from natural gas). This is the "next stage" of industrial policy after reaching food and energy self-sufficiency and successful auto industry development. There are reservations, however, about this stage and strategy. First, gas production is about to decline due to depletion of reserves. Second, the level and growth rates of TFP in heavy chemistry are by far not the highest (they are the highest in light and food industry and in machine building). An increased share of heavy chemistry of total industrial output will cause a decline in the level and the growth rates of TFP. Third, the auto industry is already a success, thus it may be reasonable to continue to support machine building industries, particularly those involving medium-level technology. Finally, for a country of this "average size," the export specialization in two major areas (autos and heavy chemistry) may prove to be excessive.

Can Uzbekistan's Economy Retain its High Growth Rate?
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By Vladimir Popov

Uzbekistan has had the most successful economy in the former Soviet Union (FSU). In 2013, its GDP was double its 1989 level. Among the countries of Eastern Europe and the former Soviet Union, only Turkmenistan and Azerbaijan could have had a doubling of GDP—due to their natural resource export capacity, which Uzbekistan does not have, though it does export gas and gold. Among transition economies, only China and Vietnam have had more impressive growth. The external and domestic public debt levels in Uzbekistan are low, its foreign exchange reserves are large, and its the exchange rate is not overvalued (Popov, 2014).

Moreover, the government of Uzbekistan, through a strong industrial policy, has managed to encourage and carry out large-scale progressive structural shifts—it achieved energy and food self-sufficiency, the share of industry in GDP, as well as the share of machinery and equipment in total industrial output and in export increased. A whole new branch of industry—its automotive industry—was created from scratch, became competitive and now exports half of its products. In 2013, Uzbekistan sold abroad about 100 thousand cars, almost as much as Russia, whose GDP is 25 times larger.

Income distribution in Uzbekistan is more even than in most other FSU countries, there are no billionaires, crime is low, and life expectancy is much higher than in countries with similar levels of per capita income.

In general, from all points of view, Uzbekistan looks like a very successful economy, so that the main task today, apparently, should be to prevent "dizziness from success", to envisage possible economic risks for the future and to develop adequate government policy responses, needed to maintain economic growth of the past 10 years (8%).

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[1] The paper reflects the views of the author and not of the organisations with which the author is affiliated.

How to predict long-term growth

Growth theory gives the following formula for growth accounting—decomposition of growth (increase in output) by factors:

dY = TFP + a * dK + (1-a) * dL, where

*dY* —economic growth (GDP)
dK – growth rate of fixed capital,
dL—the growth rate of labor (employment)
TFP—the growth rate of total factor productivity (TFP)
a—the parameter of the production function, interpreted as the share of capital in national income and equal to about 0.4 for developing countries and 0.3 for developed countries.

Population growth and the working age population (and, hence, employment, assuming the unemployment rate unchanged) are known quite accurately—demographic processes are characterized by high inertia that allows to make high-quality forecasts. In particular, the UN forecast suggests that by 2030 the total population and working-age population of Uzbekistan will grow at a rate of about 1% per year (Fig. 1). Therefore, in accordance with the formula for growth accounting the growth of employment will contribute about 0.6 percentage points (p.p.) to annual growth of GDP.

Fig. 1. Entire population and working-age population, the UN forecast, thousand persons
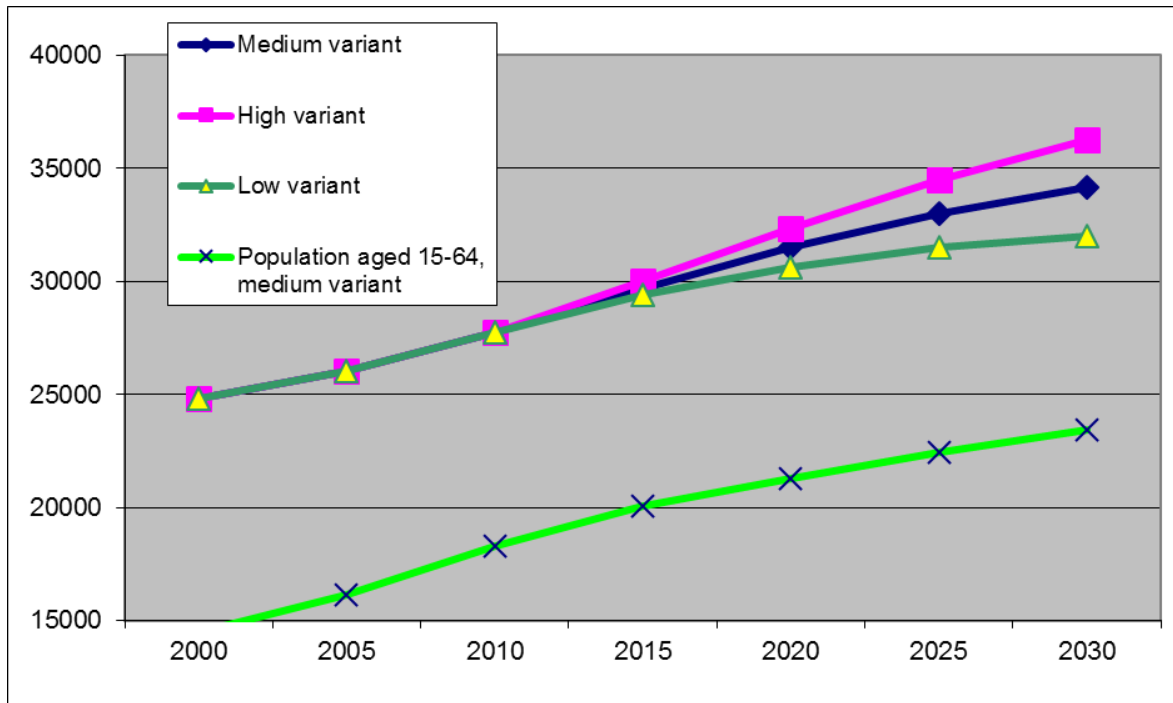
Source: UN Population, 2014

A few percentage points of GDP growth per year can be obtained from the increase in total factor productivity. In 1997-2009 growth rates of total factor productivity ranged from 0 to 4% (Chepel et al 2010), so that under favorable conditions one could expect growth of 2-3% per year.

Therefore, to achieve annual GDP growth of 8-9%[2], over 50% of growth (5-6 p.p.) must come from the contribution of capital

$a*dK/K = dY/Y - TFP - (1-a)*dL/L,$

Hence capital stock must grow at 12-15% per year ($dK/K = 6\%: 0.4 = 15\%$). And if the capital-output ratio is equal to 2 ($K/Y = 2$) and if, for the sake of the argument, the retirement of fixed capital stock is equal to zero ($dK = GR$, $R = 0$, where G—gross investments, R—retirement) the share of investment in GDP (G/Y) should be maintained at 30% ($G/Y = dk/Y = dK/K * K/Y = 15*2 = 30\%$). If the capital-output ratio would be

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[2] To achieve the proclaimed goal of per capita GDP of $7000 in 2030 (in prices of 2012) from the actual level of $1720 in 2012 (at market exchange rate), the annual growth of per capita GDP should be 8%. If population growth would be 1% a year, GDP will increase annually by about 9%.

higher than two and/or retirement will be higher than zero, the share of investment in GDP will have to be increased even more to maintain the growth rate of 8-9%.

In recent years, the share of investment in GDP in Uzbekistan was significantly lower—18-27% in 2000-12 (Fig. 2). It was particularly low in 2002-06 (18-21%), even though external conditions were favorable (high world prices for major export products—gas, gold, cotton) and there was a significant surplus on current account.

Fig. 2. Share of investment in GDP, %, current account balance as a % of GDP and GDP growth rates in 1987-2012, % (*Source: WDI***)**
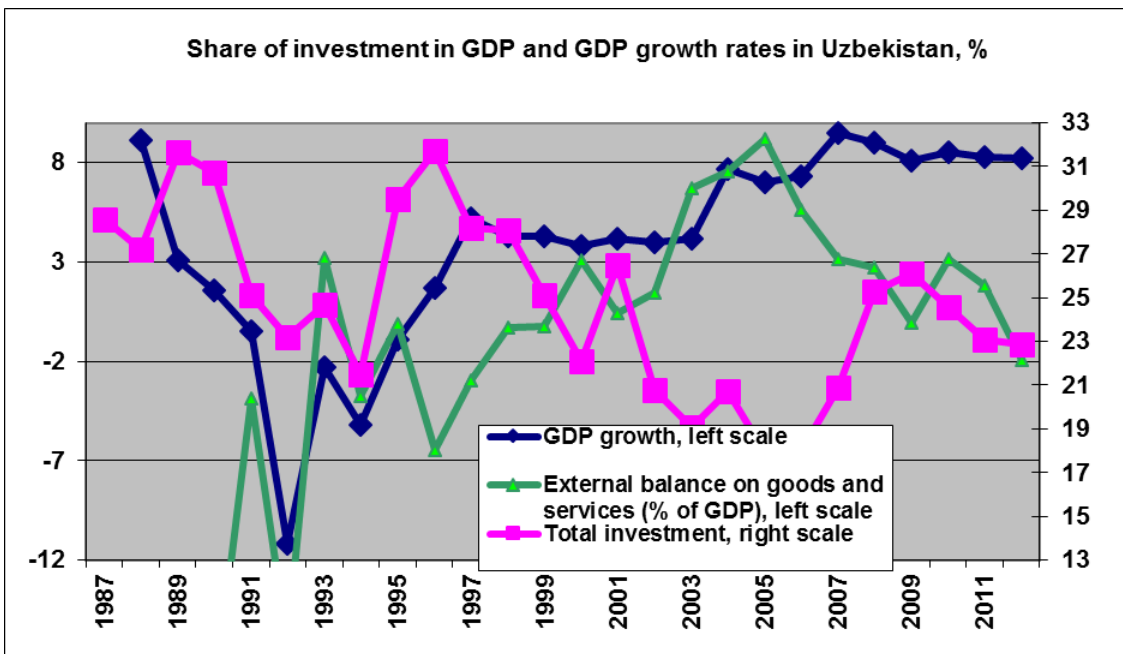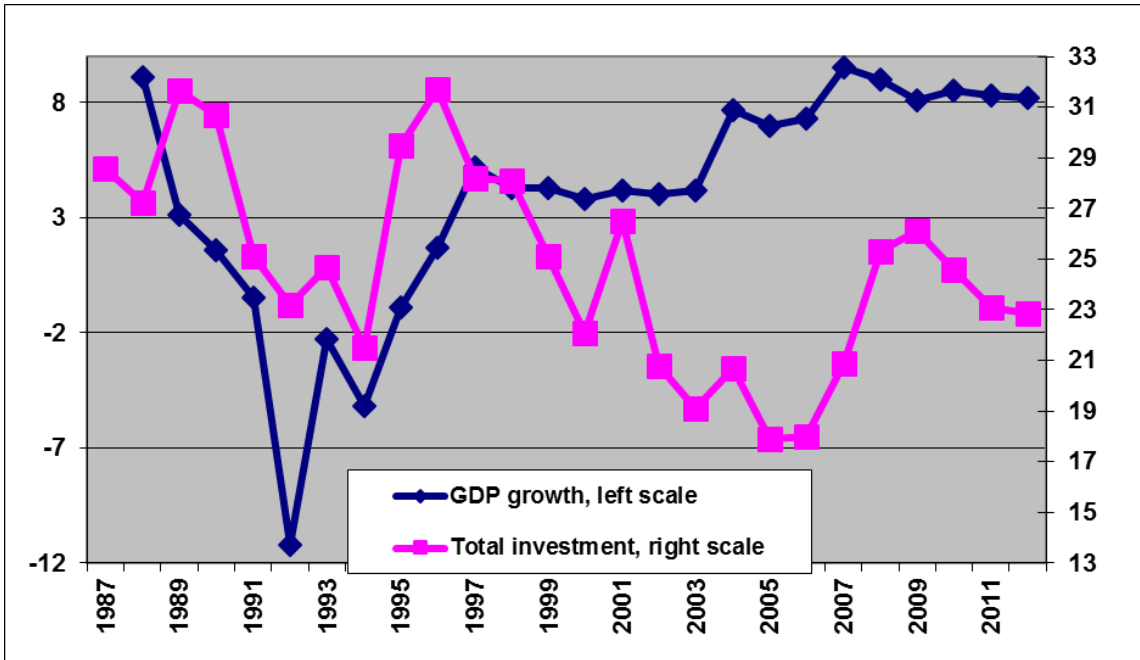
Mystery of total factor productivity

There are many papers that analyze factors of growth of TFP (see literature review in UNIDO, 2007). In neoclassical theory, total factor productivity growth is exogenous, i.e. determined outside of the model, by external factors. Endogenous growth theory attempts to explain changes in total factor productivity (labor and capital) by investments in fixed capital stock, education, R&D, foreign direct investment, the quality of institutions, openness of the economy and many other variables. Empirical studies, however, have not yet allowed us to confidently predict the growth rate of total factor productivity.

In 1994, Paul Krugman, based on growth accounting calculations in East Asia by Alvin Young, argued that the puzzle of the East Asian growth does not exist (Popov, 2002; 2010). He argued that Asia's rapid growth was mainly extensive, as in the USSR, that is was due to accelerated accumulation of capital, and was not caused by the growth in total factor productivity. He concluded that there was no great mystery in this growth at all: if the country is ready to devote more than one third of its GDP to investment, limiting consumption, then it can reach high growth rates.

In the classical theory of economic growth it is assumed that an increase in one factor of production without a proportional increase in other factors inevitably leads to diminishing returns: for example, an increase in investment in machinery and equipment without a corresponding increase in employment will produce smaller and smaller increments of output. Therefore, to bet on investment alone—to rapidly accumulate physical capital—is not a reasonable strategy: capital efficiency will fall, so that the acceleration of growth, if happens, would be most insignificant.

As an example, the advocates of this theory referred to the economic growth in the USSR, which was very high in the 1950s (8% annually), and then fell to 2-3% in the 1980s due to, as they thought, over-accumulation of capital: the share of investment in GDP in this period increased to as much as 35%, fixed capital formation proceeded rapidly, but the results were more than modest. As Alice in the Wonderland once put it, it was necessary to run twice as fast to stay in the same place. Or, as the *Economist* once wrote, the Soviet Union brought the share of investment in GDP to the Japanese level with very "un-Japanese" results.

It was believed that the Soviet economic dynamics is the best illustration of classical growth theory (Solow model): if the contribution of technical progress is negligible, as it was in late USSR, i.e. if the growth is predominantly extensive, it is impossible to

maintain high growth for a long time only with high investment; at the end of the day growth rates will inevitably fall, approaching the rate of population growth.

Therefore, Krugman predicted that the rapid growth of East Asia will soon end as the Soviet growth ended because of the depletion of reserves of labor—higher participation rates for women and decline of rural population as a result of migration to urban areas. Moreover, without the proportional increase in labor increased investment lead to diminishing returns, efficiency of accumulation decreases, growth slows down.

However, time seems to have disproved Krugman's predictions. After the East Asian crisis in 1997, growth continued and there are no signs that the growth rate of total factor productivity necessarily slows down as the share of investment in GDP increases. Say, in China TFP growth rates did not decline, although the share of investment in GDP has reached unprecedented levels in the world—almost 50%.

As can be seen from Fig. 3, in Asian countries with relatively low GDP per capita (from $2700 to $6200 PPP –purchasing power parity) and in middle income countries (from $9,000 to $17,000 at PPP) TFP growth rates rose rather than fell, whereas in richer countries, including the U.S., they seem to have remained stable. TFP growth in the developed countries and territories (Hong Kong, Singapore, United States, Taiwan, South Korea, and Japan) usually did not exceed 2% (Fig. 3). In the United States—a country that was in the past 100 years at the forefront of technological progress, the growth rate of TFP was in 1870-2010 of the order of 1-2% and only in certain periods (the Great Depression of the 1930s, when both employment and capital declined sharply, World War II) rose to 3% (Table 1).

Fig. 3. Rates of growth in total factorial productivity in Asian countries with different levels of income per capita and in the U.S. in 1970-2010

Countries with a per capita GDP at PPP from $2700 to $6200 in 2012
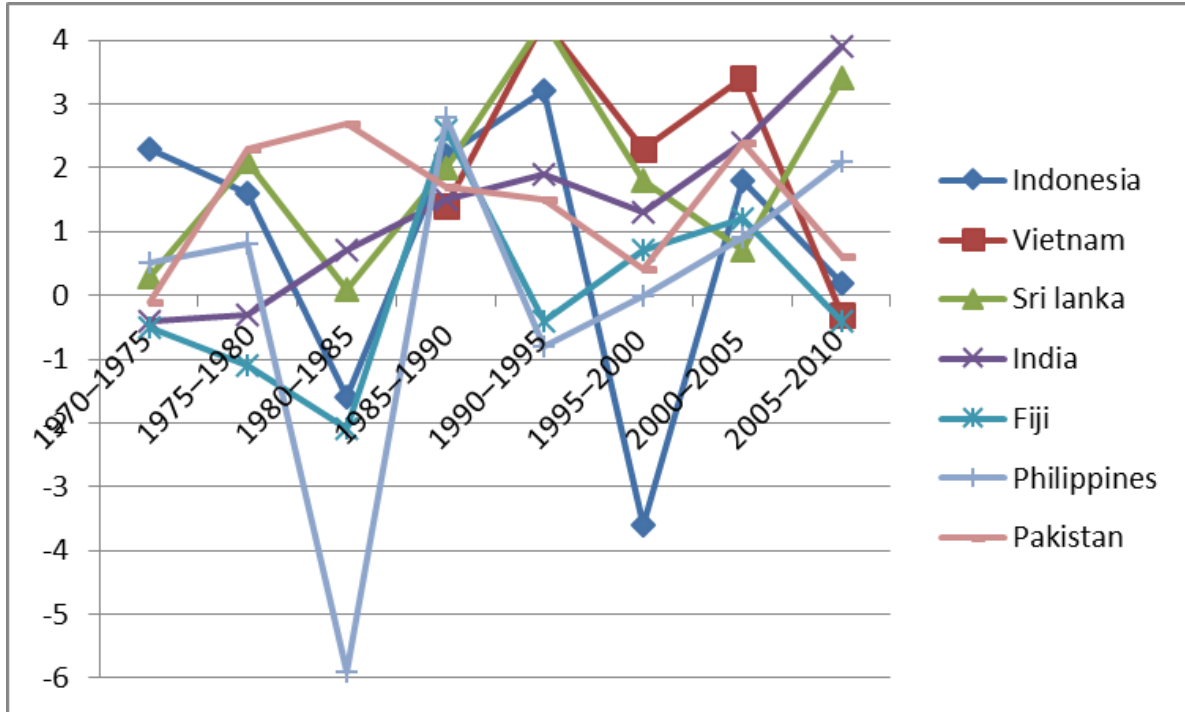
Countries with a per capita GDP at PPP from $9000 to $17,000 in 2012
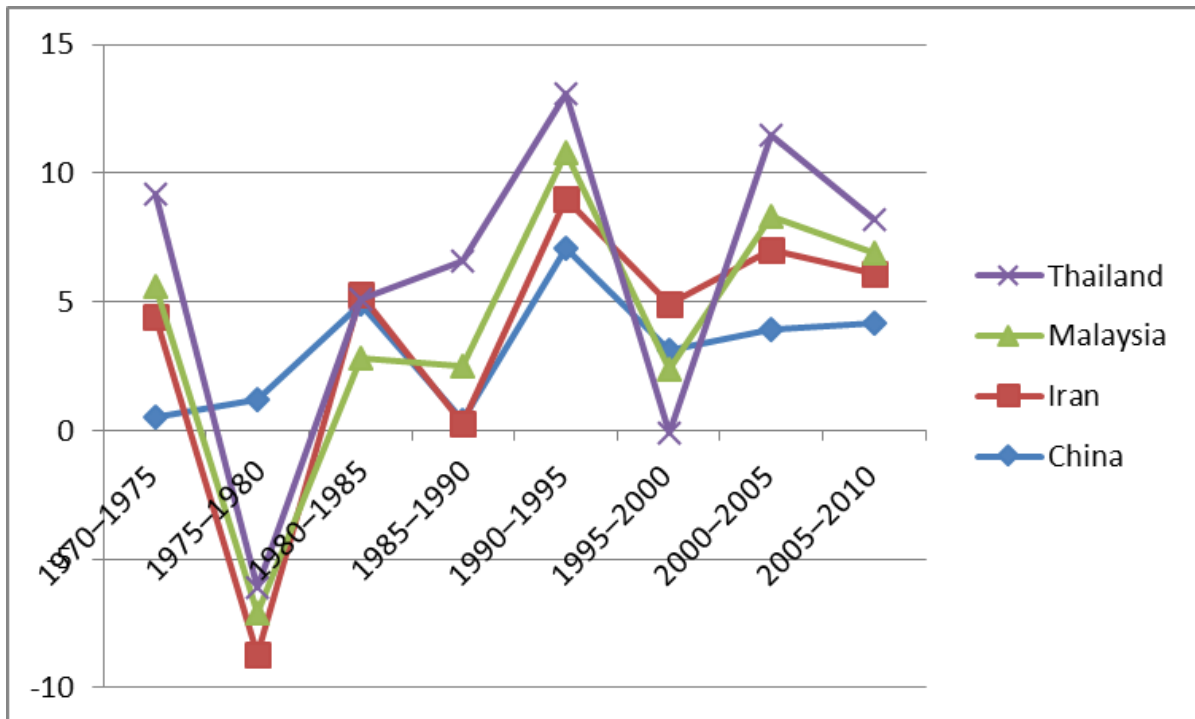
Countries with a per capita GDP at PPP from $30,000 to $52,000 in 2012
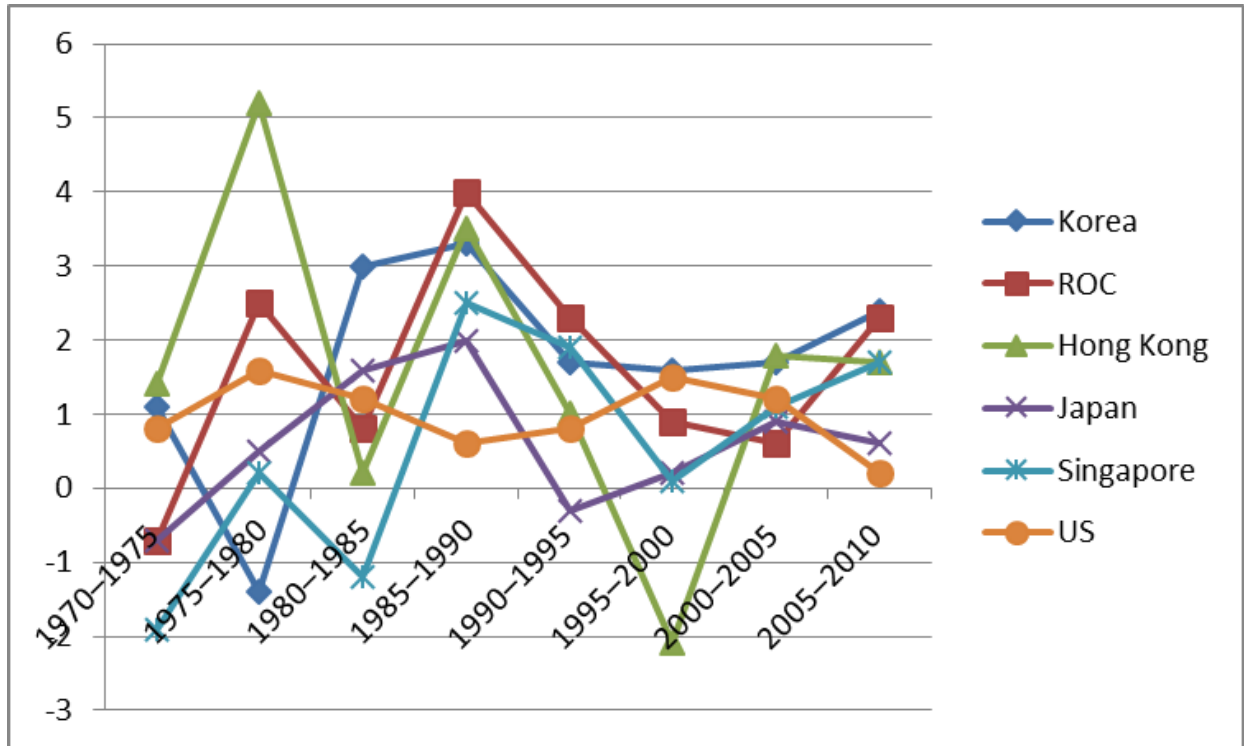
Source: APO (2013)

Table 1. Growth rate of total factor productivity in the U.S. in 1870-2010, %

Period	Average annual TFP growth rates
1870 to 1900	~ 1.5% to 2%
1900 to 1920	~ 1%
1920s	~ 2%
1930s	~ 3%
1940s	~ 2.5%
1950 to 1973	~ 2%
1973 to 1990	< 1%
1990s	> 1%
2000s	~ 1.5%
1870 to 2010	~ 1.6% to 1.8%
1950 to 2010	~ 1.2% to 1.5%

Source: Shackleton (2013)

In most successful catch-up economies (China, Iran, Malaysia, and Thailand) TFP growth often exceeded 5% per year (Fig. 3). However, in countries with similar to Uzbekistan per capita income level, TFP growth was no higher than 3% (Fig. 3). So it makes sense to assume that under the most favorable circumstances TFP growth in 2015-30 would remain at the level of 2—3%.
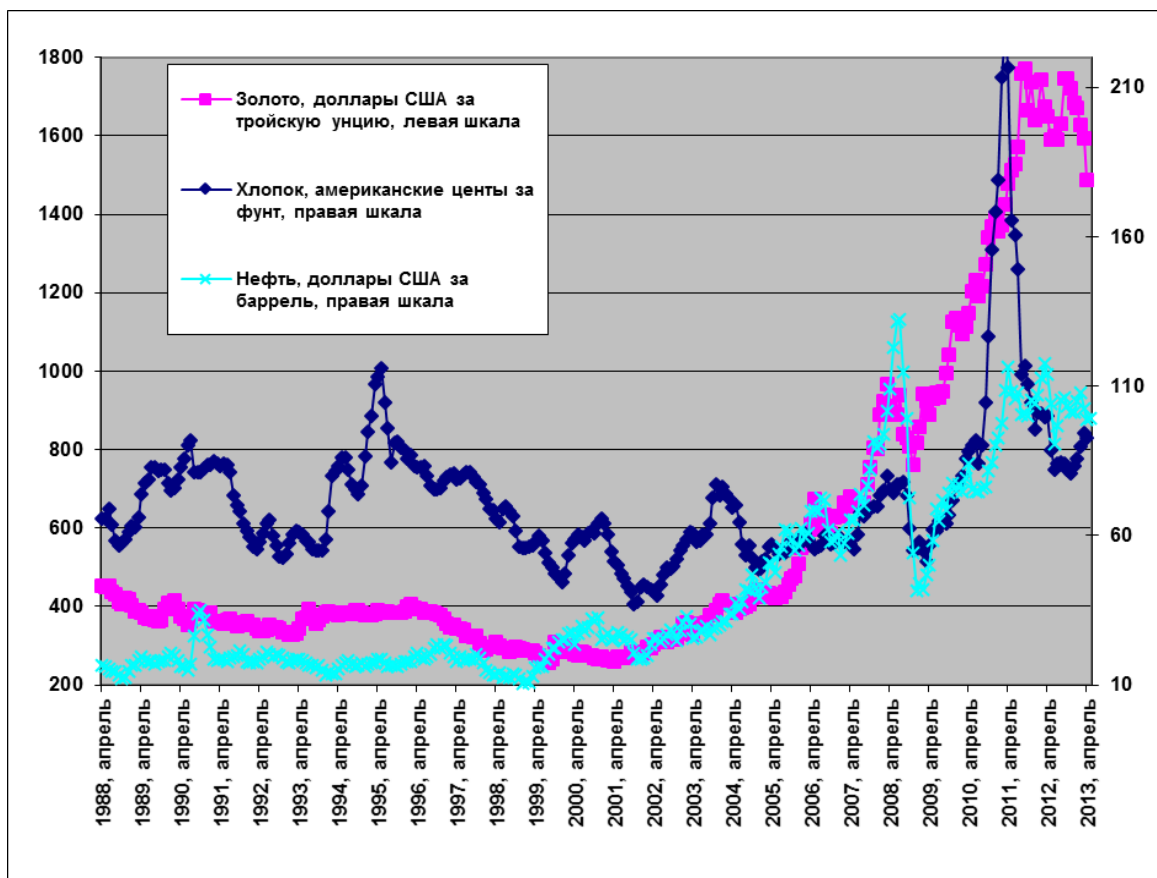
Scenarios for the future growth

Favorable scenario. TFP growth rates do not slow down, remain at the level of 2-3% per year, export prices remain high, so that the trade balance and balance of payments on current account are in surplus. In this case, to ensure the growth of 8-9% the share of investment is expected to grow somewhat by the end of the period (2030) only if capital –output ratio would increase and higher share of investment in GDP would thus be required to achieve the same growth of fixed capital stock (15%)—Table 2.

Under this option, there may be a gradual return of migrants working abroad. On the one hand, their return will reduce remittances that will negatively affect the balance of payments. On the other hand, if they find a job in Uzbekistan in the export sector, losses from reduced remittances can be compensated by the increase in foreign exchange earnings from export growth. Moreover, the return of migrants can significantly increase the rate of employment growth in Uzbekistan: the return of 100,000 people a year would add 1 percentage point to employment growth, i.e. would add about 0.6 percentage points to annual economic growth rate. But in this case it will be necessary to provide returning migrants with jobs that would require an additional increase in the growth rate of fixed capital—by 1 percentage point. To achieve such acceleration in growth of fixed capital stock it would be necessary to raise accumulation rate (the share of investment in GDP) by 2 p.p., for example, from 25 to 27% of GDP. This will provide additional 0.4 percentage points GDP growth, so that economic growth will increase by 1 percentage point (0.6 % + 0.4%).

Unfavorable scenarios. Falling prices for the main items of the Uzbek exports—gold, gas and cotton, which can cause deterioration in the trade and current account balances in the amount of 10% of GDP (in the past 20 years, current account balance varied between minus 7% and plus 9% of GDP—Fig. 2). As can be seen from Fig. 4, prices of these products in the past 5 years were pretty high, so their decline in the future cannot be ruled out.

Fig. 4. World prices for gold, oil and cotton, 1988-2013

Source: Index Mundi
*(http://www.indexmundi.com/commodities/?commodity=cotton&months=300&commodity=gold&indicato
r=price-ratio)*

In this case, there are different policy options: (1) devaluation of the national currency,
(2) reduction of foreign exchange reserves without sterilization operations of the central
bank, (3) reduction of foreign exchange reserves, fully sterilized by the central bank, that
is, without changing the money supply in circulation. In the third case, reduction of
saving can be avoided, but in the first two cases at least some reduction of private
savings and investment is inevitable, so to maintain the previous rate of economic
growth this decline should be compensated by increased public savings and investment.
Without such a compensation a reduction of savings and investment by, say, 10 p.p. of
GDP will cause a fall in the rate of growth of capital by 5 percentage points ($K/Y = 2$),
which can slow down economic growth by about 2 percentage points per year ($dK*a =
5*0.4 = 2$). To avoid a decrease in growth, it will be necessary to increase the rate of
accumulation by 10 percentage points through the mobilization of domestic savings
and/or attracting capital from abroad (Table 2).

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Table 2. Scenarios of economic development in 2015-2030

Scenario	TFP growth rate	Current accounts balance	Change in annual growth rates	Increase in investments necessary for sustainable growth
Basic—favorable	2-3%	Unchanged (at levels of 2010-13)	0	0 (stays at current level of 25 % of GDP)
Unfavorable— worsening of terms of trade	2-3%	Decrease by 10 % of GDP	Decrease by 2 pp.	Increase by 10 p.p. of GDP (up to 35% of GDP)
Unfavorable— decrease in TFP growth rate	0%	Unchanged (at levels of 2010-13)	Decrease by 2-3 pp.	Increase by 10-15 p.p. of GDP (up to 35-40% of GDP)
Worst case	0%	Decrease by 10% of GDP	Decrease by 4-5 pp.	Increase by 20-25 p.p. of GDP (up to 45-50% of GDP)

Another unfavorable scenario—the slowdown of growth of total factor productivity by 2-3 percentage points, i.e. to about zero from the current level. This could happen because of the shifts in sectoral structure of production towards capital-intensive industries, due to the depletion of mineral deposits, due to massive investments in infrastructure and human capital (irrigation, roads, education, health), which do not produce immediate returns. This could also happen for reasons that we do not know. As was argued previously, to predict with certainty the dynamics of TFP in future is not possible, so it is only prudent to be prepared for unfavorable scenarios of change. In this case, economic growth will fall by 2-3 percentage points and an increase in investment required to compensate for this decline, will amount to 10-15% of GDP (Table 2).

Worst-case scenario. If the deterioration of terms of trade coincides with a decrease in the rate of growth of total factor productivity, there may be a decline in economic growth rates by 4-5 percentage points, i.e. more than twice. To compensate for this reduction, the share of investment in GDP would have to rise to 45-50% (Table 2), which seems hardly possible in a short period of time.

How can the government respond to the downside risks?

To compensate for the decline in growth due to possible deterioration of terms of trade and (or) falling growth rates of total factor productivity it is possible to increase investment financed via internal or external (capital inflows) savings. *Strictly speaking, this is virtually the only way to counter the slowdown, as the growth of TFP and labor*
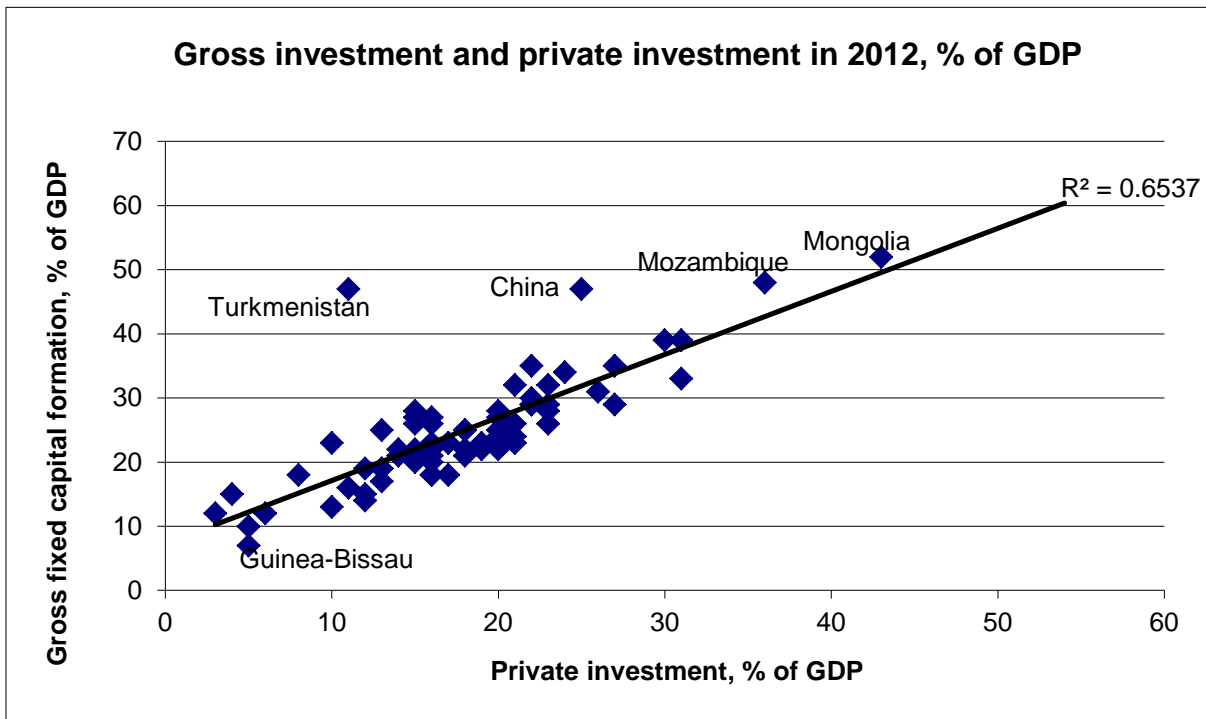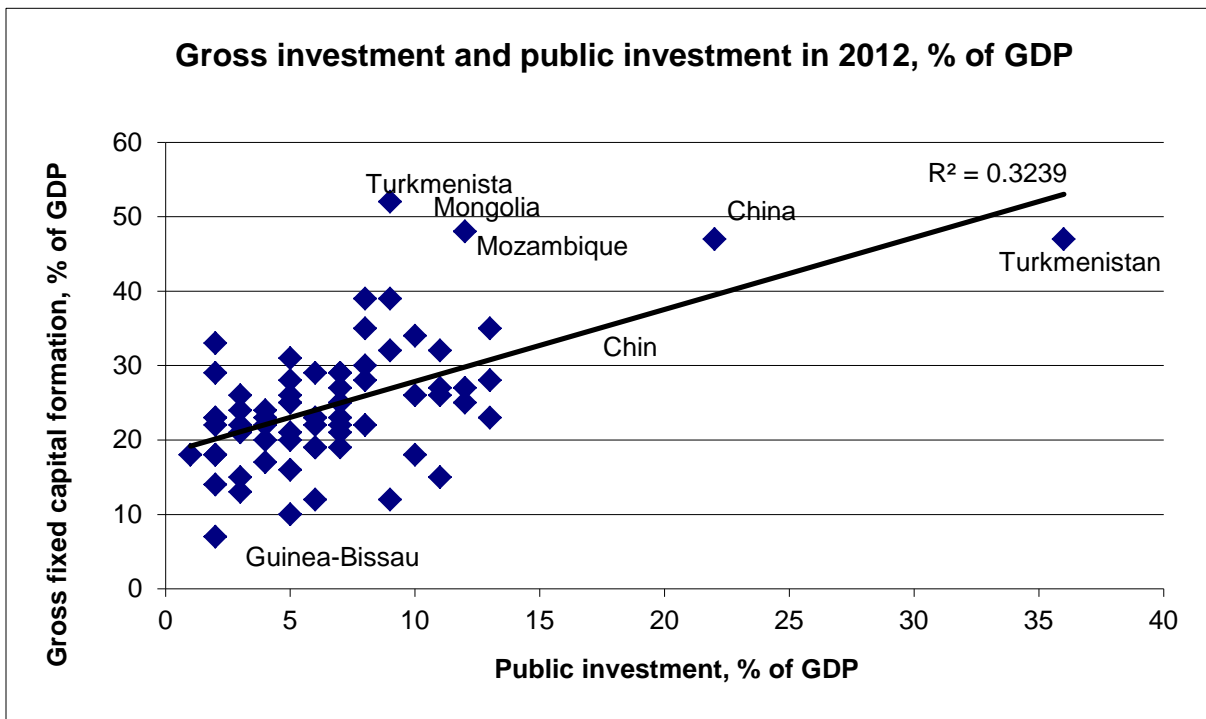
(employment) are determined largely by objective factors, that is, cannot be easily affected by government policy.
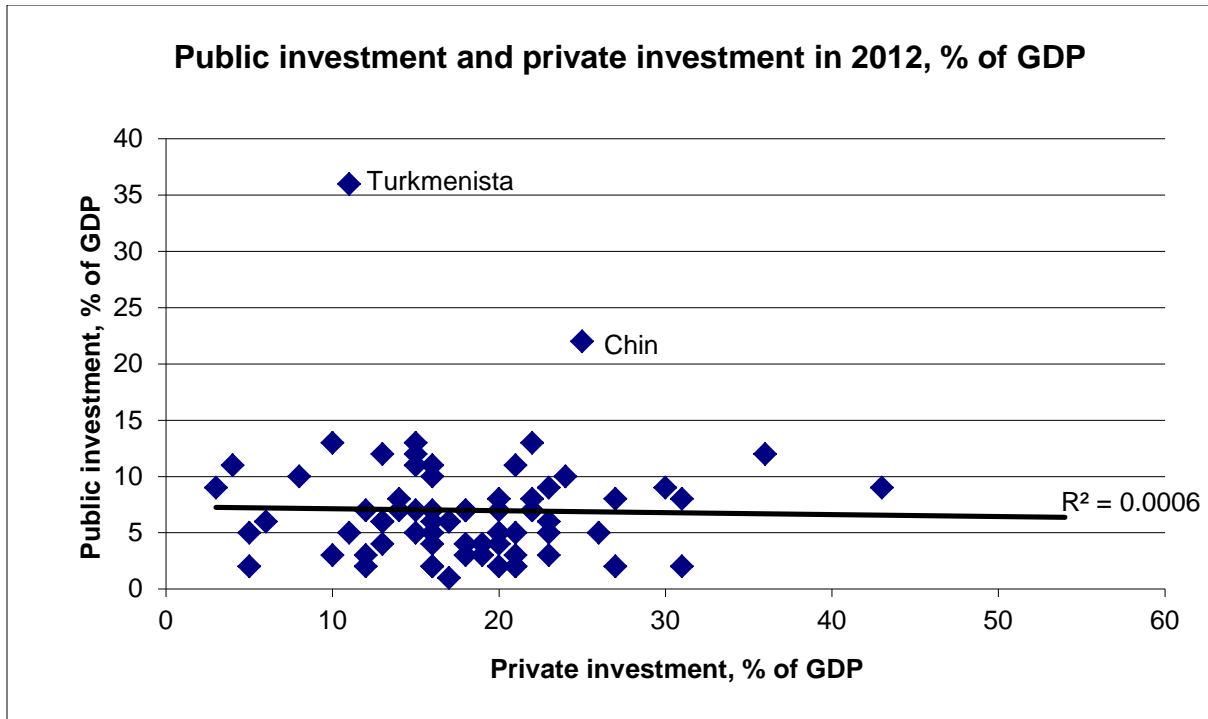
Luckily, to mobilize additional savings Uzbekistan has significant reserves. Firstly, the current savings rate—less than 25% of GDP—is not too high, many countries with a similar level of development have higher share of savings and investment in GDP. The share of investment in GDP in 2012 in Botswana, Belarus, China, India, Indonesia, Laos, Lesotho, Mauritania, Niger, Tanzania, Tonga was 30% or more, whereas in China, Mongolia, Mozambique, Turkmenistan it was over 40%. Secondly, the state budget is balanced with a surplus, and the internal and external debt is low, so there is the possibility of mobilizing savings through higher taxes, as well as via increase in domestic and foreign borrowings to finance public investments.

As can be seen from Fig. 5, not only private but also public investments contribute to increasing the share of investment in GDP. If for some reason private investments are in limbo, the state can achieve the increase in total investments through the expansion of its own public investment projects financed through taxes and/or borrowings. Government savings (financing public investment through government budget and/or budget surplus), as the studies show, do not crowd out private savings in a proportion of 1:1, but only in a proportion of 25-50 cents for every dollar ((Schmidt-Hebbel, Serven, and Solimano 1996). In low income countries, as recent research shows, an extra dollar of government investment does not crowd out, but crowds in private investment—raises them by roughly two dollars and output by 1.5 dollars (Eden, Kray, 2014).

Strictly speaking, even under a favorable scenario it is advisable to strive to increase the share of investment in GDP in order to increase investment in infrastructure, education, health—areas that experienced a distinct lack of funding in the 1990s and in the 2000s. This will lay the foundations for the future growth and will allow avoiding surprises associated with aging and retirement of worn-out assets.

Fig. 5. Private and public investment as % of GDP in 2012

Gross investment and public investment in 2012, % of GDP

R² = 0.3239

Turkmenista

Mongolia

China

Mozambique

Turkmenistan

Chin

Guinea-Bissau

Gross fixed capital formation, % of GDP

Public investment, % of GDP

Gross investment and private investment in 2012, % of GDP

R² = 0.6537

Turkmenistan

China

Mozambique

Mongolia

Guinea-Bissau

Gross fixed capital formation, % of GDP

Private investment, % of GDP

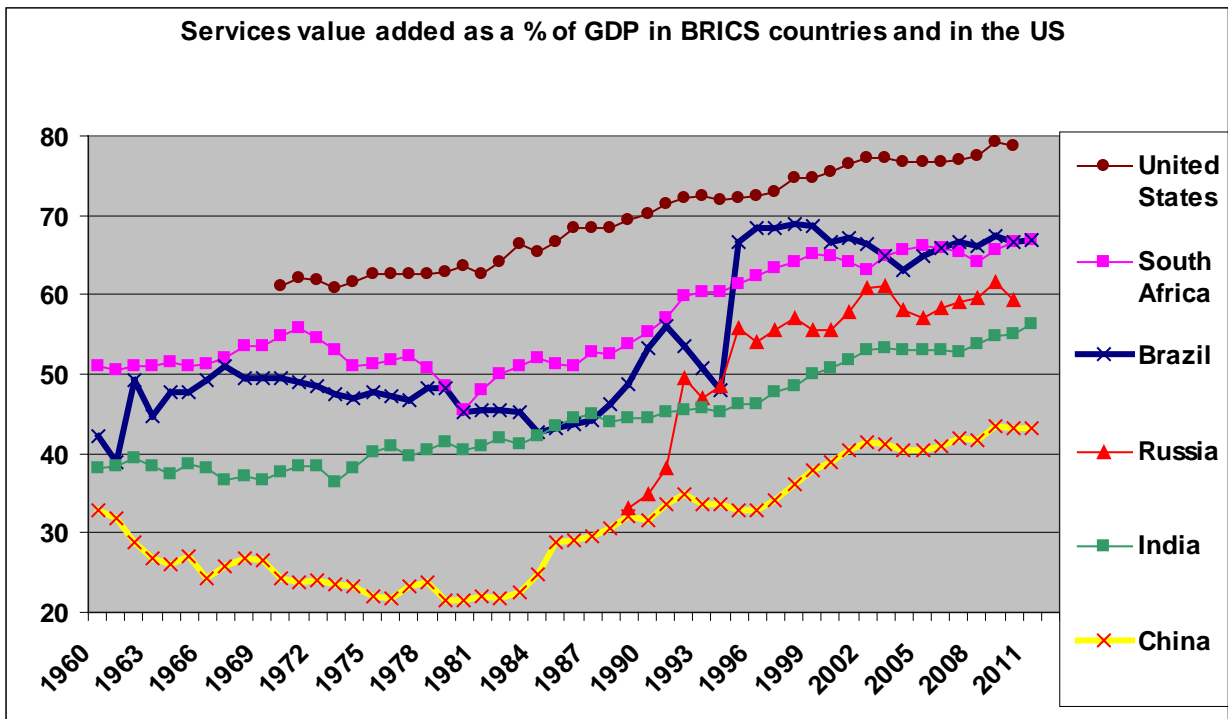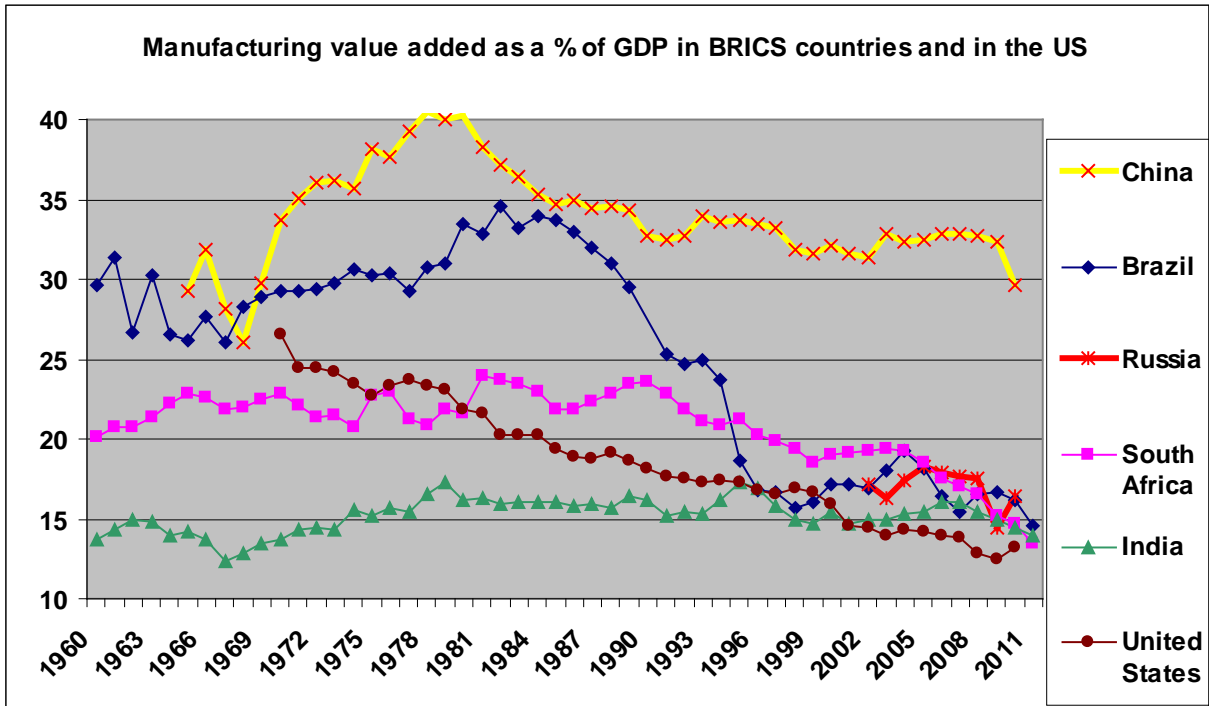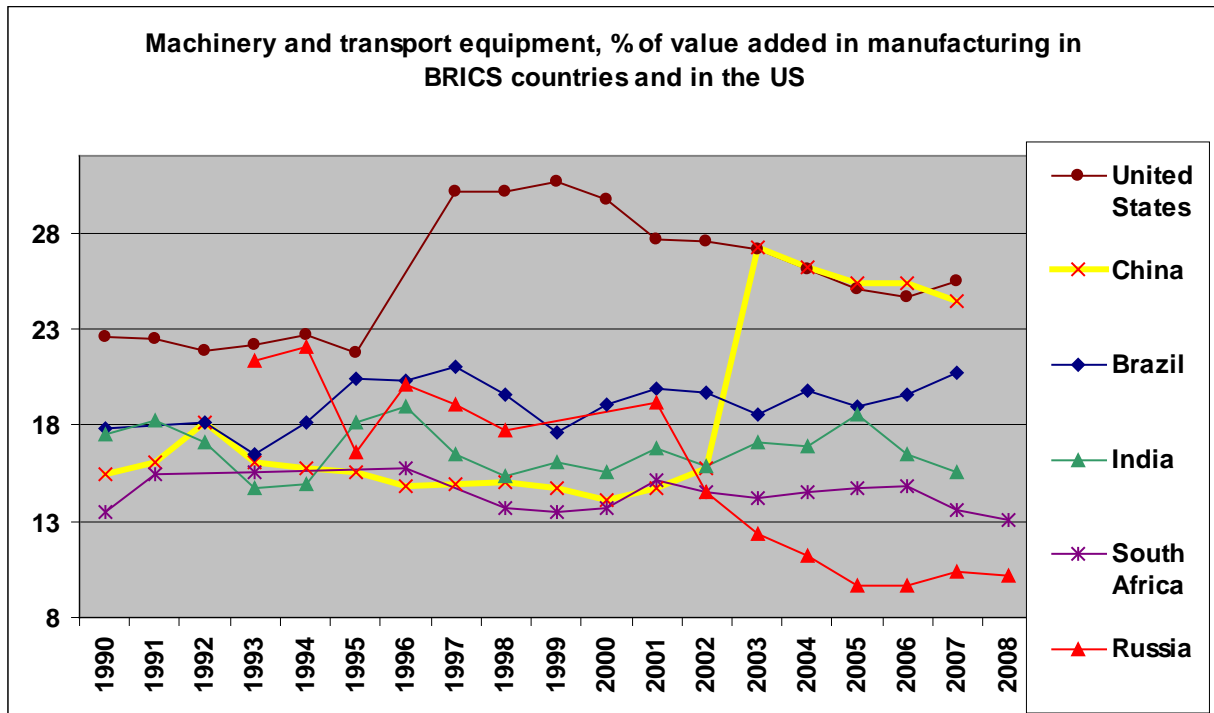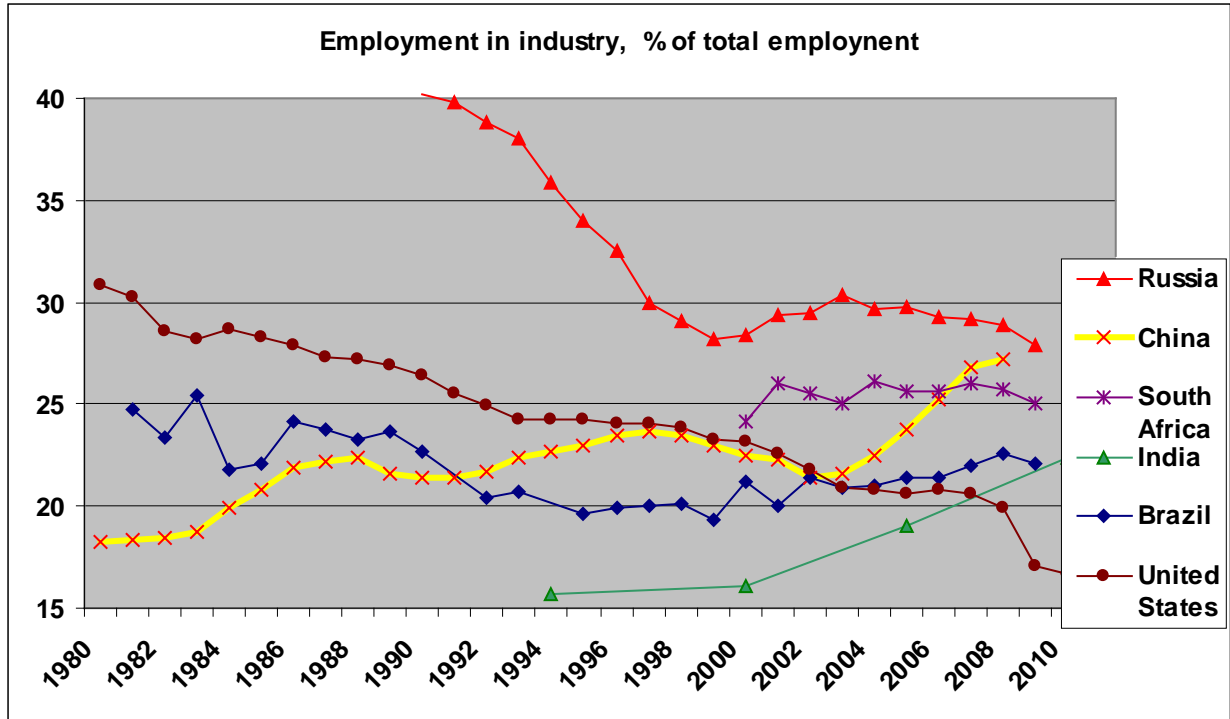**Public investment and private investment in 2012, % of GDP**

Source: WDI

Which industries should develop at faster pace?

Reduction of the share of industry in GDP and the increase of the share of services—an objective process, but in the fast-growing countries (China), this decline was slower than in the others (Fig. 6). At the same time the increase in the share of machinery and equipment in manufacturing output, as in China (Fig. 6), usually accompanies rapid growth or even becomes the engine of growth. We do not know of any cases of rapid growth ("economic miracles"), which were based on accelerated growth of service sector. Increase in the share of industry in Uzbekistan over the past decade should therefore be considered a positive trend.

Fig. 6. The share of manufacturing and services in GDP, the share of industry in employment, the share of machinery in manufacturing value added

Manufacturing value added as a % of GDP in BRICS countries and in the US

Services value added as a % of GDP in BRICS countries and in the US

Employment in industry, % of total emploment

Machinery and transport equipment, % of value added in manufacturing in BRICS countries and in the US

Source: World Development Indicators

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What are the particular manufacturing industries that could become the engine of growth is a difficult question. Unfortunately, economic theory does not suggest any definite clues, except the idea that these industries should have the highest externalities, i.e. their social returns should be higher than private returns. But it is not so easy to measure these externalities. There may be several ways, though, to determine the industries that should be supported in the framework of industrial policy.

One could benefit from the experience of other countries: it is known that relatively poor countries began to export textiles and shoes, then moved to the export of steel products and heavy chemicals, then—to the export of cars and electrical products (washing machines, refrigerators), then—to consumer electronics and computers. This scheme is called the "flying geese"—as more competitive countries move to more advanced types of export, the vacated niches are occupied by less developed countries.

The transition from one exported good to the other could be dictated by the cycle of innovations. As Lee (2013) suggests, this cycle is short for electronics and long for pharmaceutical and chemicals; this may explain, why East Asian countries that mostly focused on industries with short cycles managed to avoid growth slowdowns while moving from one export niche to another. Justin Lin, the former chief economist of the World Bank, developed the idea of comparative advantages following and comparative advantages defying industrial strategy: the best result, according to his argument, could be achieved, if countries develop industries that are consistent with their comparative advantages, determined by their endowment structure, and do not try to overleap necessary stages aiming at exporting goods that are exported by very advanced countries (Lin, 2011).

An opposite approach is that of Hausmann, Hwang, Rodrik (2006). They show that the gap between the actual level of development and the hypothetical level that corresponds to the degree of sophistication of a country's exports is strongly correlated with productivity growth rates (Hausmann et al., 2006; Rodrik, 2006). To put it differently, it pays off to promote exports of sophisticated and high tech goods. Not all the countries that try to promote such exports succeed, but those that do not try, virtually never engineer growth miracles[3].

One can also try to support several industries that seem promising, declaring that assistance will end, if the increase in export is not achieved within, say, five years. This is

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[3] The only exception could be Botswana that had the highest rate of per-capita income growth in the world in 1960-2000. This growth was primarily driven by exports of primary commodities (namely, diamonds) and not of high-tech goods.

called "EPconEP"—*effective protection conditional on export promotion* (Jomo, 2013). Economic policymaker in this case is similar to the military commander, who begins an offensive on several fronts, but throws reserves where there has been a breakthrough.

One can try to calculate where, in which specific industries, limited investment will give the greatest effect leading to the creation of globally competitive production. Most likely, these would be industries with the highest level and highest growth rates of total factor productivity, industries that lag behind the most advanced countries less than the others.

Finally, it is possible to choose candidates for support largely at random. It is only important to be consistent—embarking on the path of support of a particular industry, not to turn back, even if there is no immediate success and a breakthrough in the world markets. After all, the modern theory of international trade explains country specialization not by comparative advantages, but by "learning by doing."

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

Uzbekistan created from scratch the car industry, which today produces more than 200 thousand cars (and their engines), and half of them are exported (Popov, 2014). It is an undisputable success of industrial policy, a breakthrough to the world markets with the products of the medium level of research intensity, which previously could have been achieved only by countries of higher level of development.

In recent years, however, the next round of industrial policy focuses on heavy chemistry—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, Ustyurt gas chemical complex at Surgil deposit. Such a strategy could create difficulties for economic growth.

First, the gas reserves are close to depletion, it is projected that gas production will start to decline from 2015 (World Bank, 2013), so the use of gas for the production of polypropylene and other chemical products will lead to a decrease in energy self-sufficiency. If the World Bank forecasts are correct (Fig. 7), Uzbekistan will have to import more oil and (or) gas to satisfy domestic demand for energy, even though today the country is a net exporter of fuel. Besides, production of synthetic liquid fuels from gas will further reduce already low capacity utilization at two existing refineries in Uzbekistan.

Fig. 7. World Bank Forecast of energy production and consumption in Uzbekistan till 2030
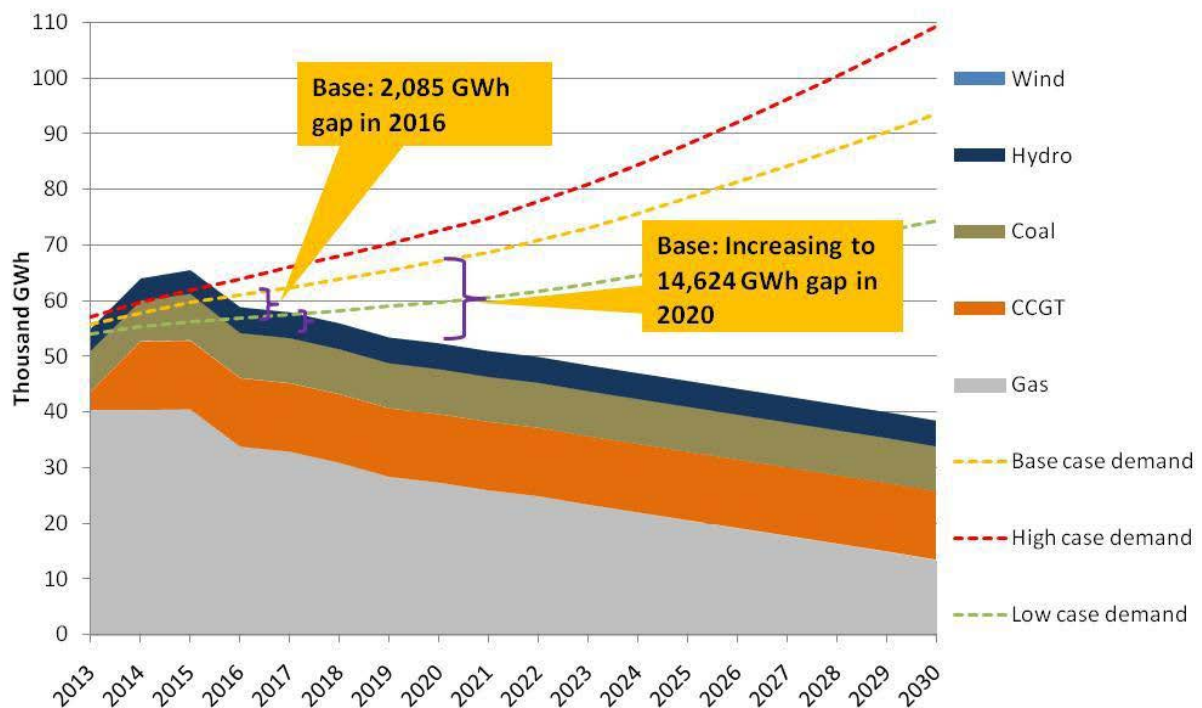
Source: World Bank, 2013

Second, the focus on the development of heavy chemistry industries can lead to the slowdown of growth or even to the reduction of the level of TFP. Calculations by IFMR (Chepel et al., 2014) show that the level of labor 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.

Thirdly, the focus on medium tech engineering goods (auto industry) has justified itself, it is a proven route, perhaps it would be better to develop success in this area and along

these lines of specialization, rather than trying to create a new competitive industry from scratch. The scale of the Uzbek economy may not be sufficient to specialize on more than one group of industries.

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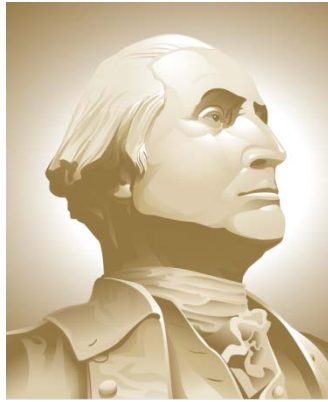
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