

Chapter 4: KNOWLEDGE TRANSFER, GENERATION AND ABSORPTION

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UNECE Innovation Performance Review of Tajikistan

Dushanbe

Features of innovation in low and middle income economies

- In low and middle-income economies innovation largely takes place **by users** or in their **interaction with suppliers** of machinery and equipment.
- Most often innovation is **new to the local firms and to the country** and is focused on **adaptation of new equipment** and **mastering production capability** through *learning by doing*.
- Most innovation in low-income economies are **incremental** in nature, **demand driven**, and mainly based on learning, adoption and adaptation;
- they are local learning-based innovation, being **diffused mainly within country** and based on **adoption and adaptation**

Major factors that drive knowledge transfer, generation and absorption of relevance to Tajikistan I

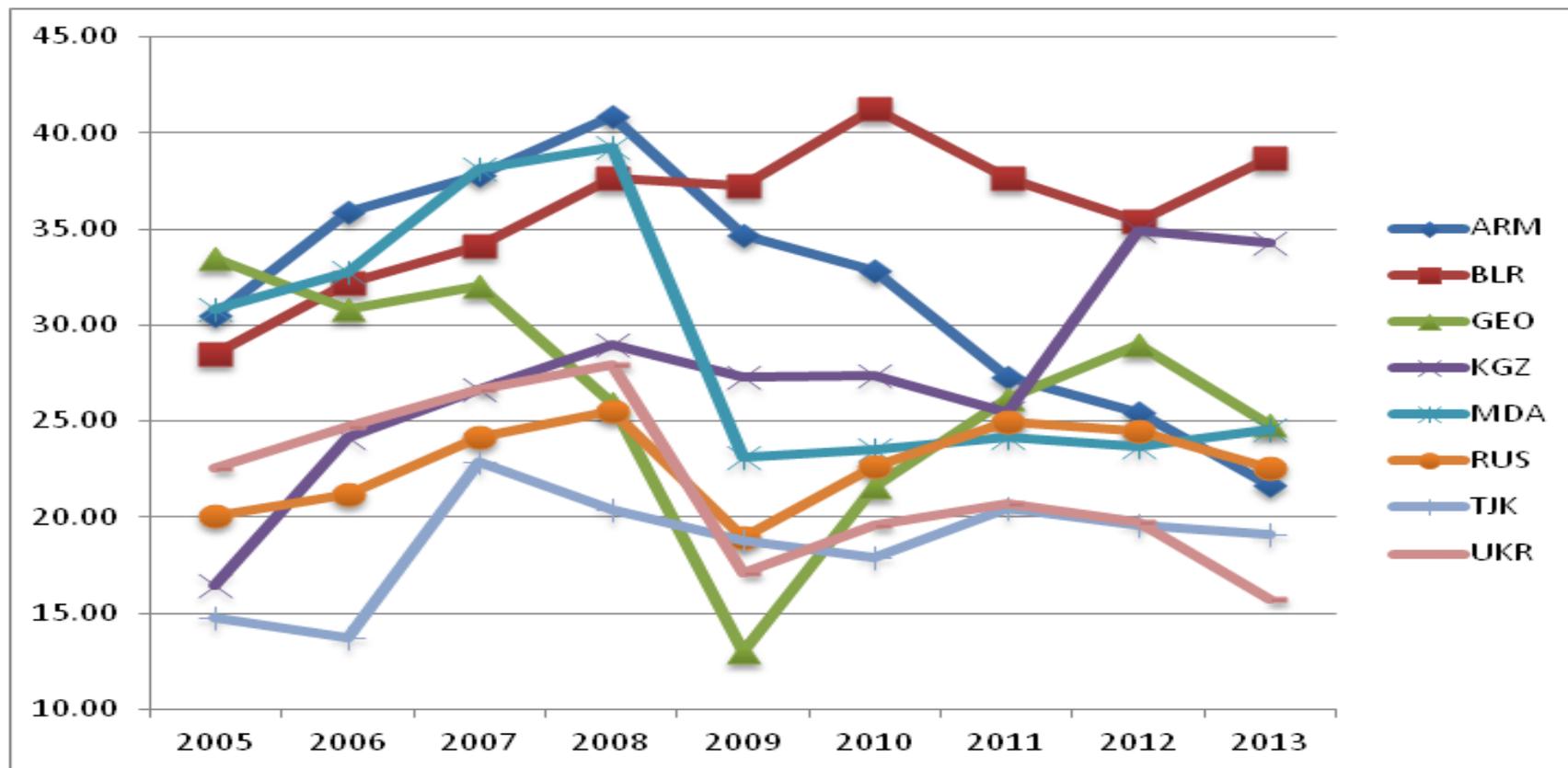
- **Physical investments**
 - Increased capital per employee plus more recent equipment tends to embody more productive new technology
- **Production capability**
 - Production capability is the capability to produce at world standards of efficiency and quality at a given technology
- **Human capital and skills**
 - Education is essential though learnt knowledge need to be further deepened and extended in ways that can only be done effectively within the organisational context of enterprises
 - this requires commitment and investment by enterprises and its management and its employees.

Major factors that drive knowledge transfer, generation and absorption of relevance to Tajikistan II

- **Openness and acquisition of foreign knowledge via trade, global value chains and FDI**
 - Domestic enterprises are major actors in innovation process but they are often heavily reliant technological knowledge that is embedded in trade, subcontracting and FDI
 - Are FDI and subcontracting are enhancing technological learning and capability accumulation
- **Own R&D and technological capability**
 - Capabilities to create new knowledge or to transform knowledge into new products and processes
 - R&D is rarely sufficient for generating innovation. Non-R&D activities like design and engineering capabilities are very often key to industrial growth of many middle income economies.
 - Different nature of R&D in low income economies as Tajikistan
- **Business and regulatory environment**
 - Competition, the rule of law, and the enforcement of contracts are all positively related to greater productivity growth

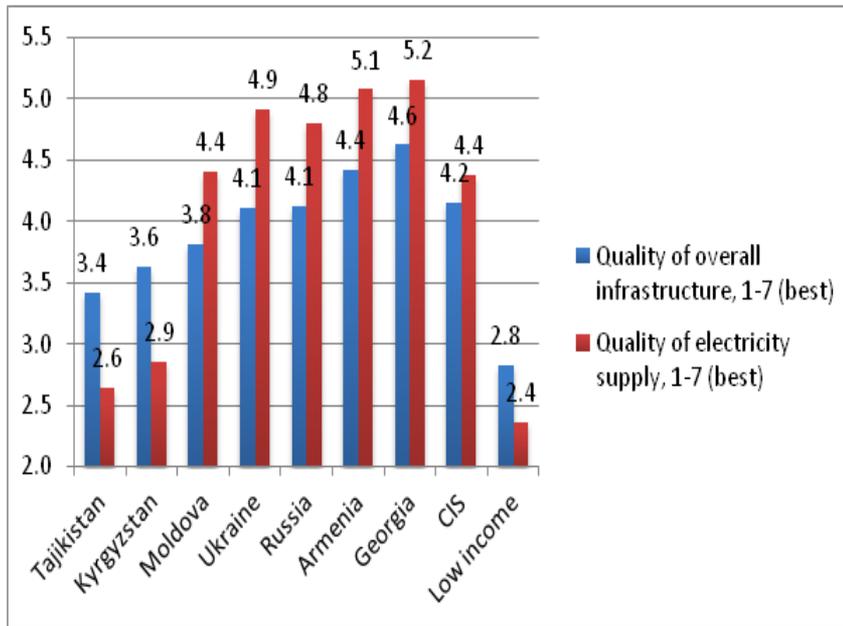
Investment and infrastructure: unexpectedly low rate of investments given Tajik investments needs and opportunities

Gross capital formation (% of GDP)

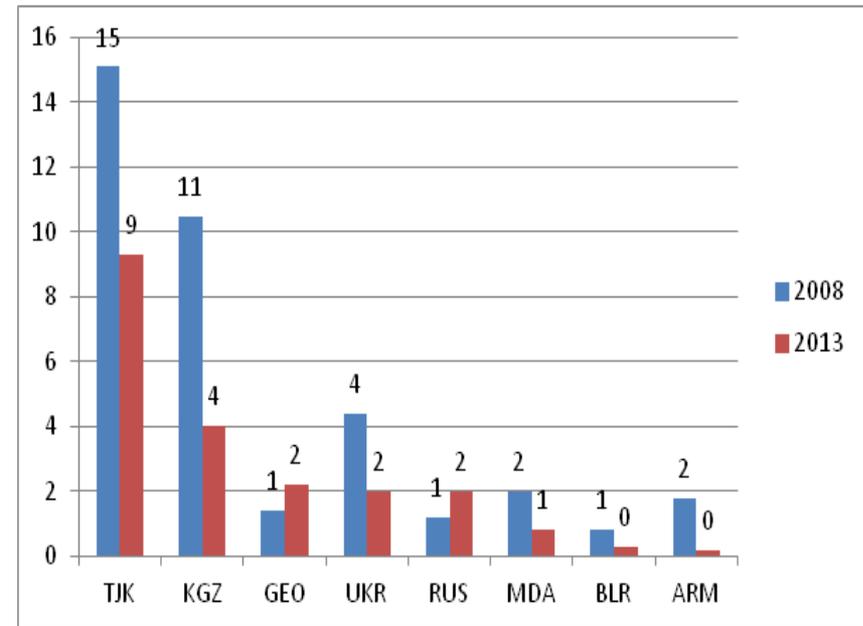


Infrastructure as important constraint to firms' operations and expansion

Assessment of quality of overall infrastructure and of electricity supply



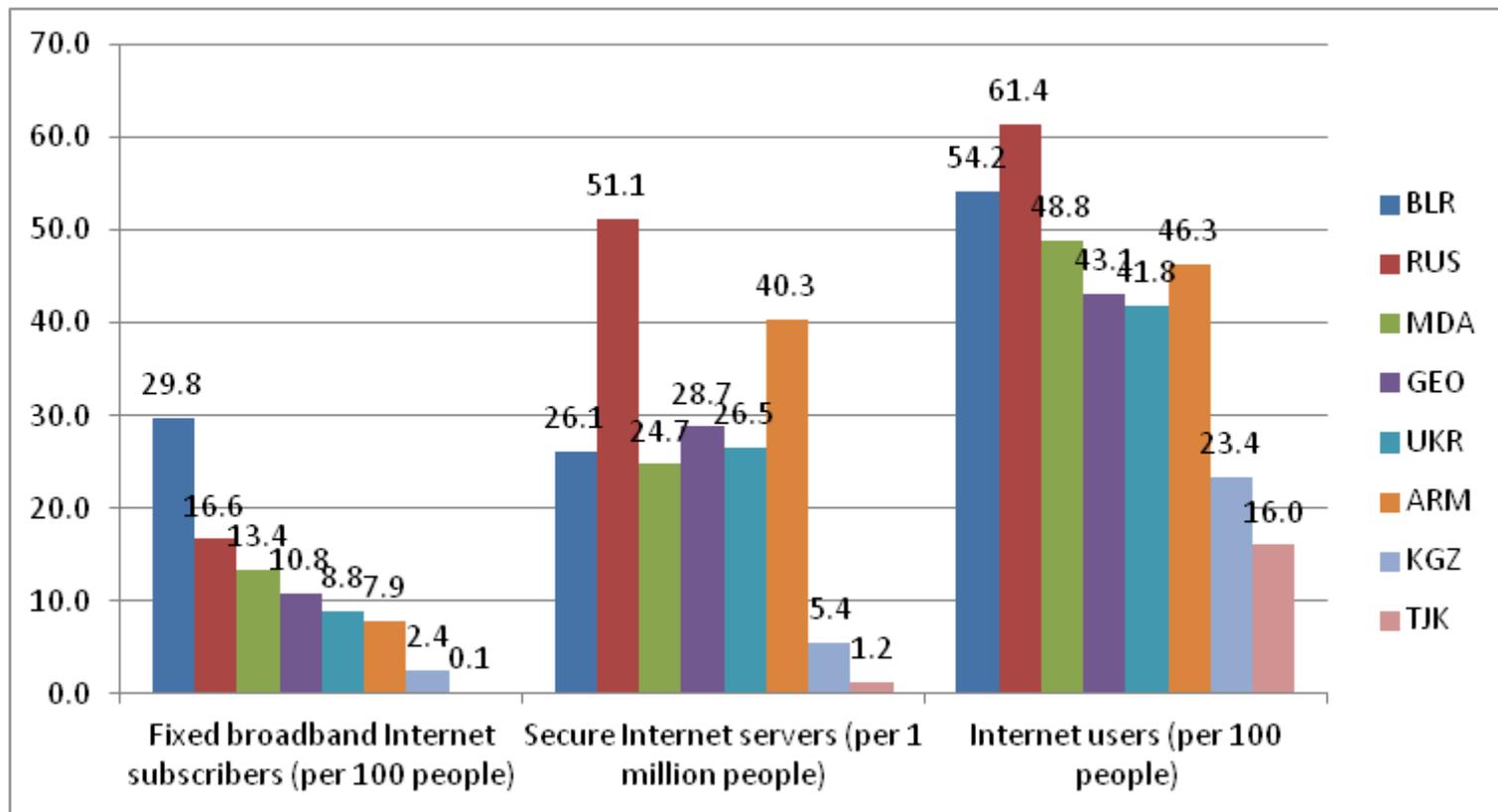
Value lost due to electrical outages as the percentage of sales lost due to power outages.



Low overall quality of infrastructure and significant losses due to electricity shortages

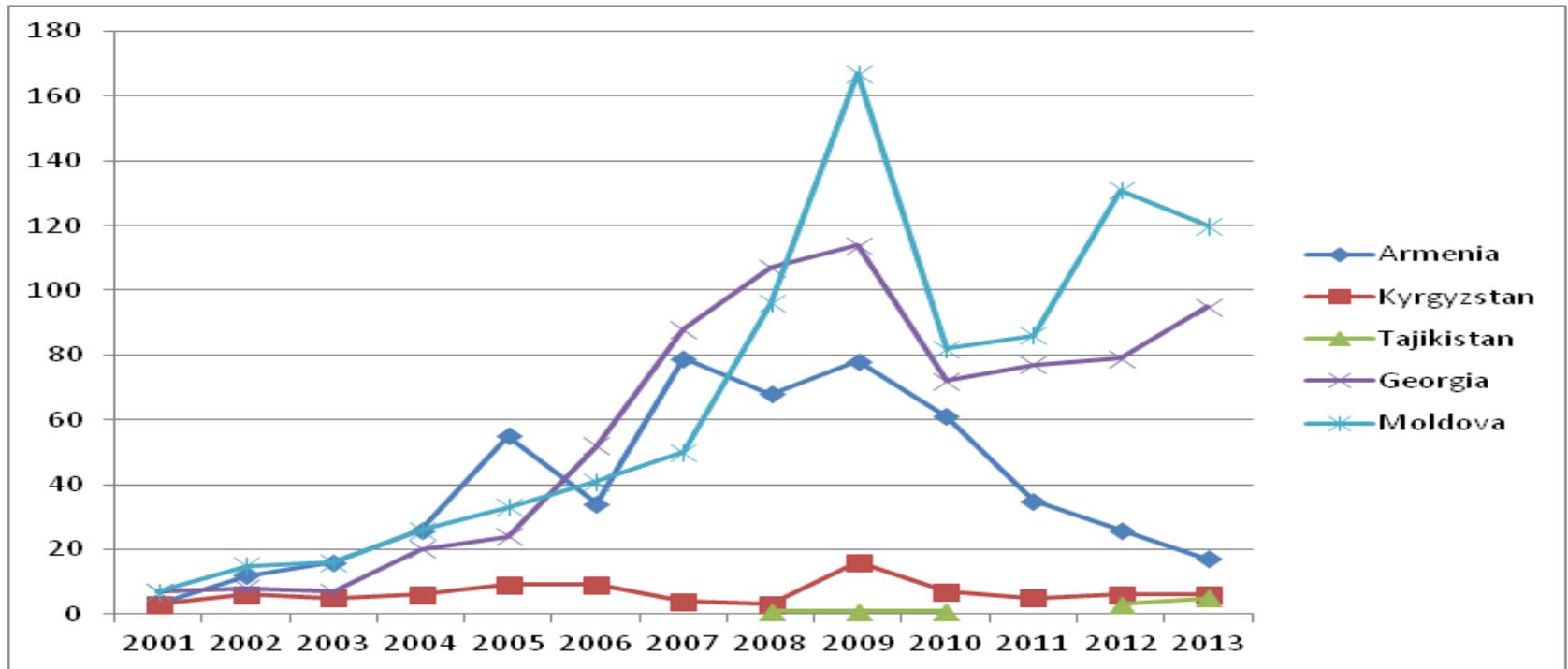
Very poor capacity to engage in external, or internal web assisted business

Internet indicators 2013



ISO certificates are generic management standard which indicate that there are in place businesses process which should guarantee operational efficiency (**production capability**)

The number of Tajik firms that have adopted ISO9001 standard is almost nil

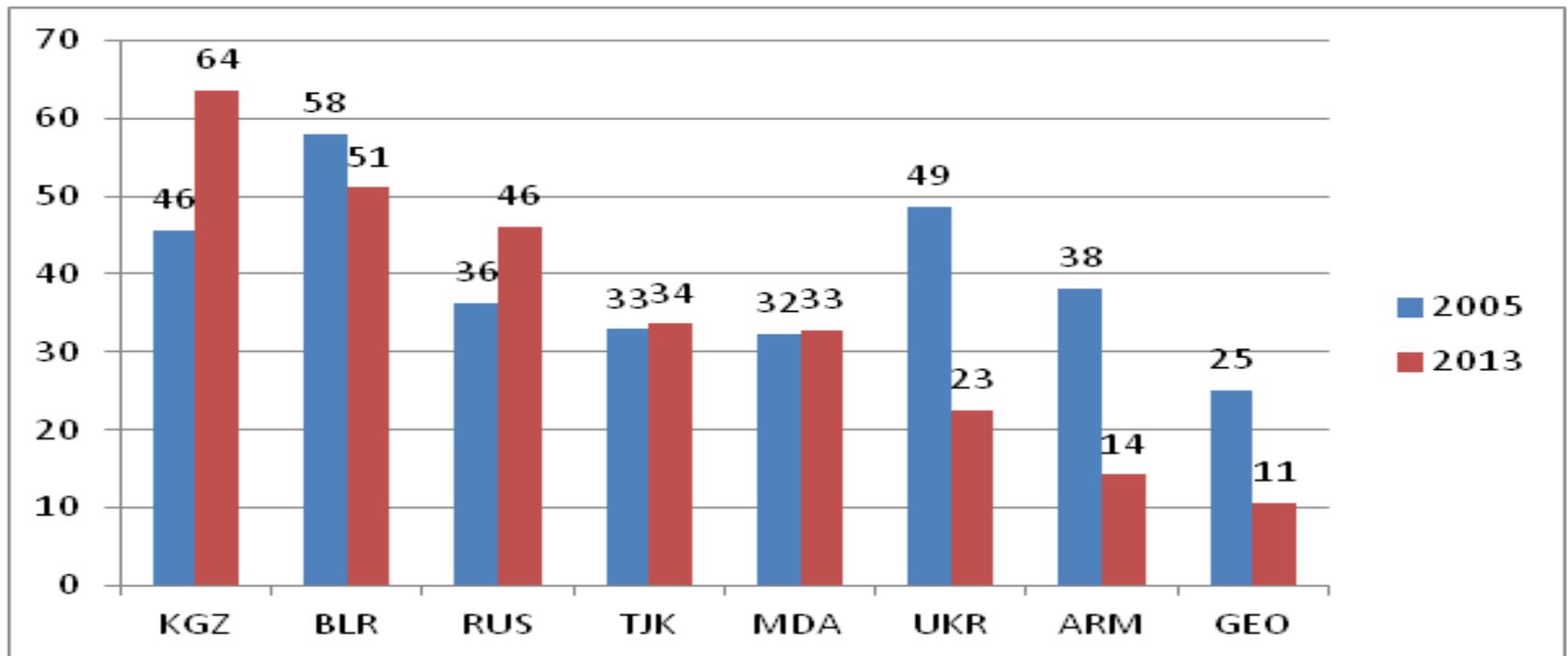


Quality and exportability of food products

- Food industry is quite important for Tajikistan but **no Tajik company** has certified for ISO2200 food safety certificate in the last few years.
- ISO data show that there were only **two Tajik companies** in 2008 and 2009 that were sites covered by ISO 22000 certificates

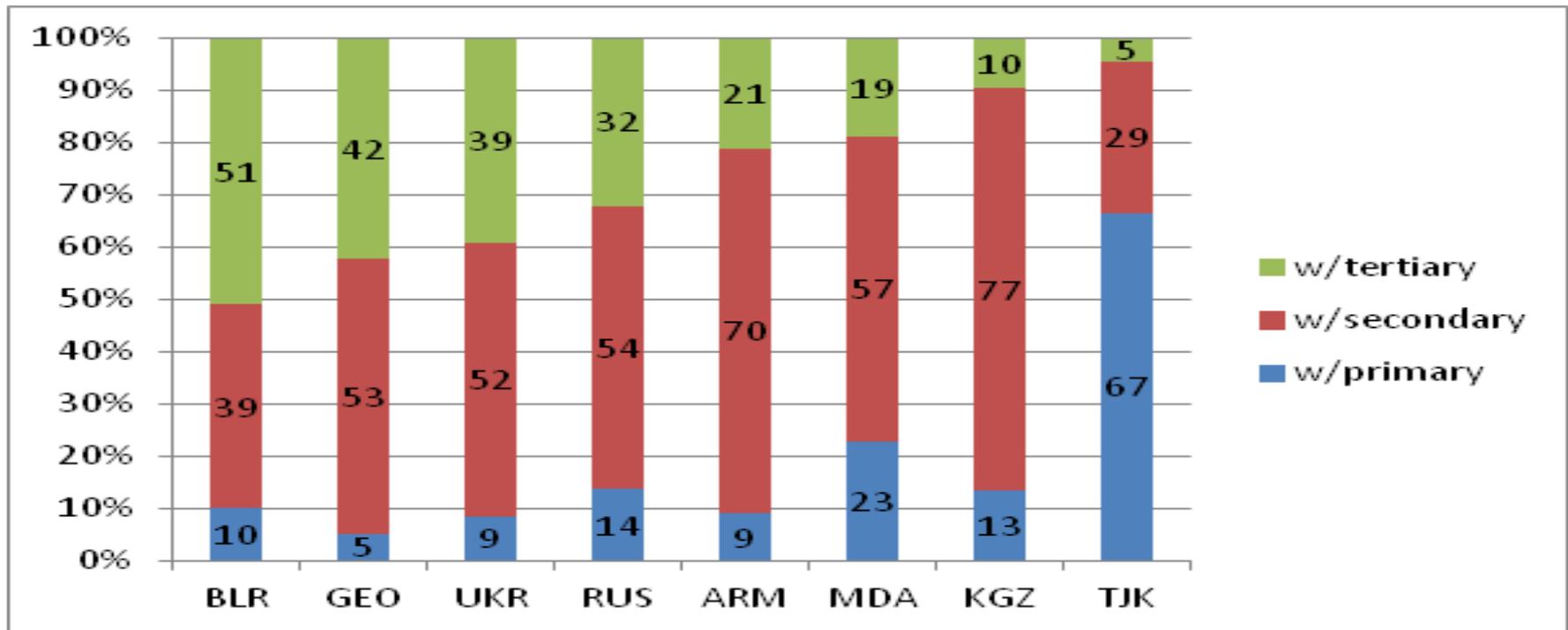
Tajik companies are doing better than would be expected in terms of offering training to its employees> around 33%-34% of firms offer formal training to an employee, which puts Tajikistan in the middle of its peers' distribution.

Firms offering formal training (% of firms)



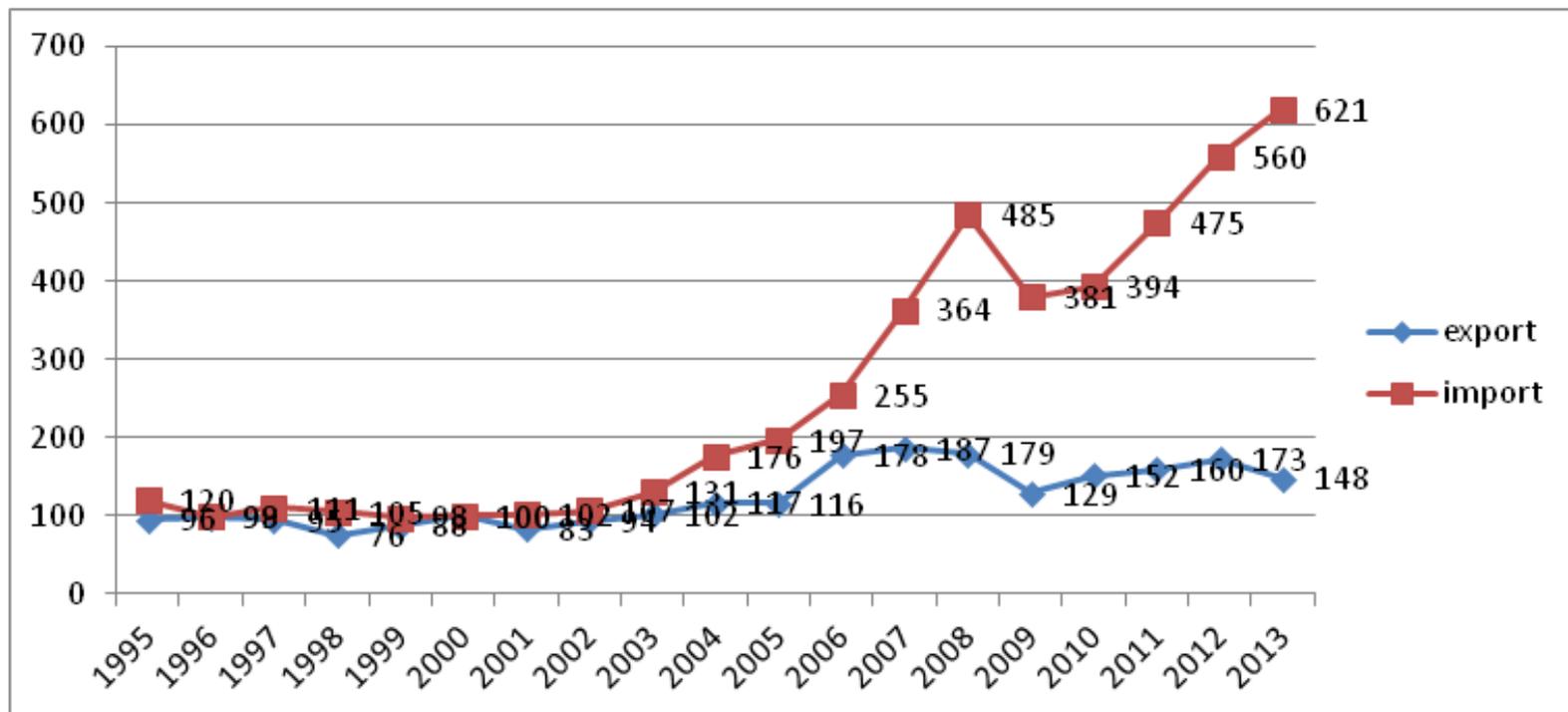
There is demand for highly skilled in Tajikistan as the share of unemployed with tertiary and secondary education are only 5% and 29% respectively. So, unemployment which in 2013 was 10,7% is largely an issue for those with only primary education and only partly for those with secondary education

Unemployment by level of education (% of total unemployment), 2013



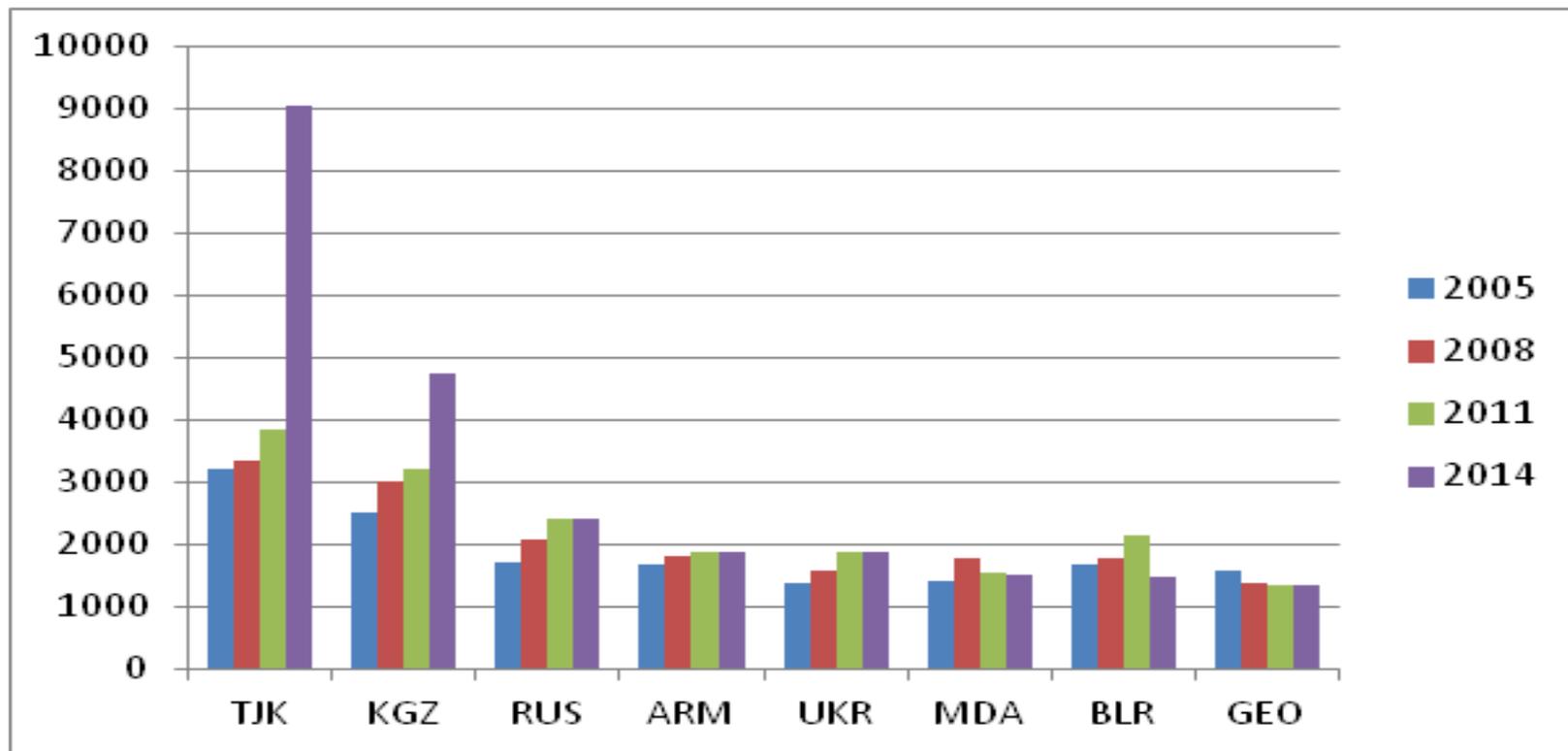
Tajikistan faces **high trade balance constraint**, which it has been overcoming through high inflow of remittances. however, this growth mode is quite sensitive to external events and the country needs to substantially improve its **export capacity**.

Export and import of Tajikistan in value (index 2000 =100)



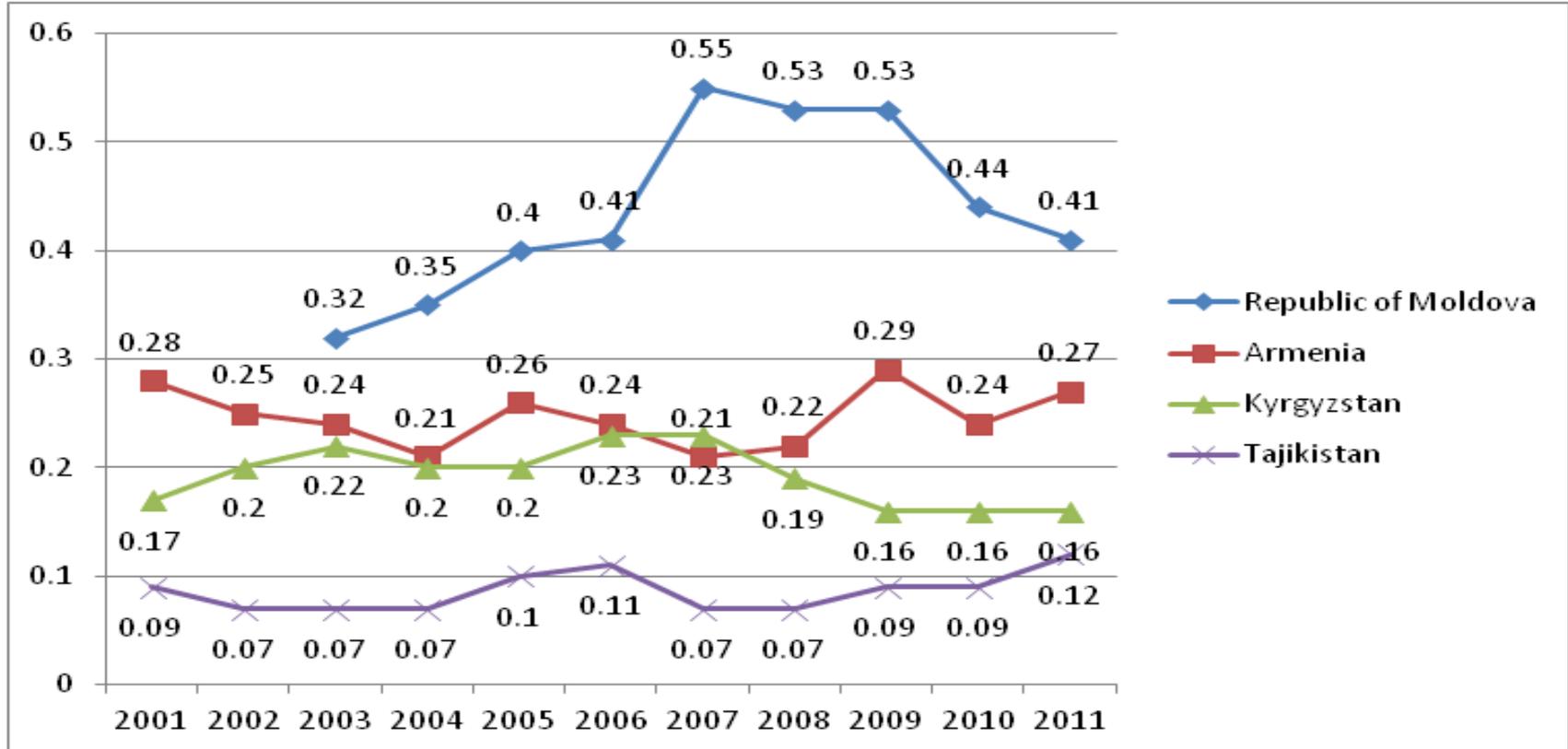
Very poor or almost inexistent integration in global value chains + specific Tajik difficulties to trade across border due its geographical position and still very undeveloped trading infrastructure

Cost to export (US \$ per container)



Tajikistan R&D investments are quite marginal when compared to its peer economies. They range around 0.1% of GDP which is half of Armenian or relative shares, and the way below Moldavian shares of 0.4 to 0.5% of GDP

Gross expenditures in R&D (GERD) in GDP

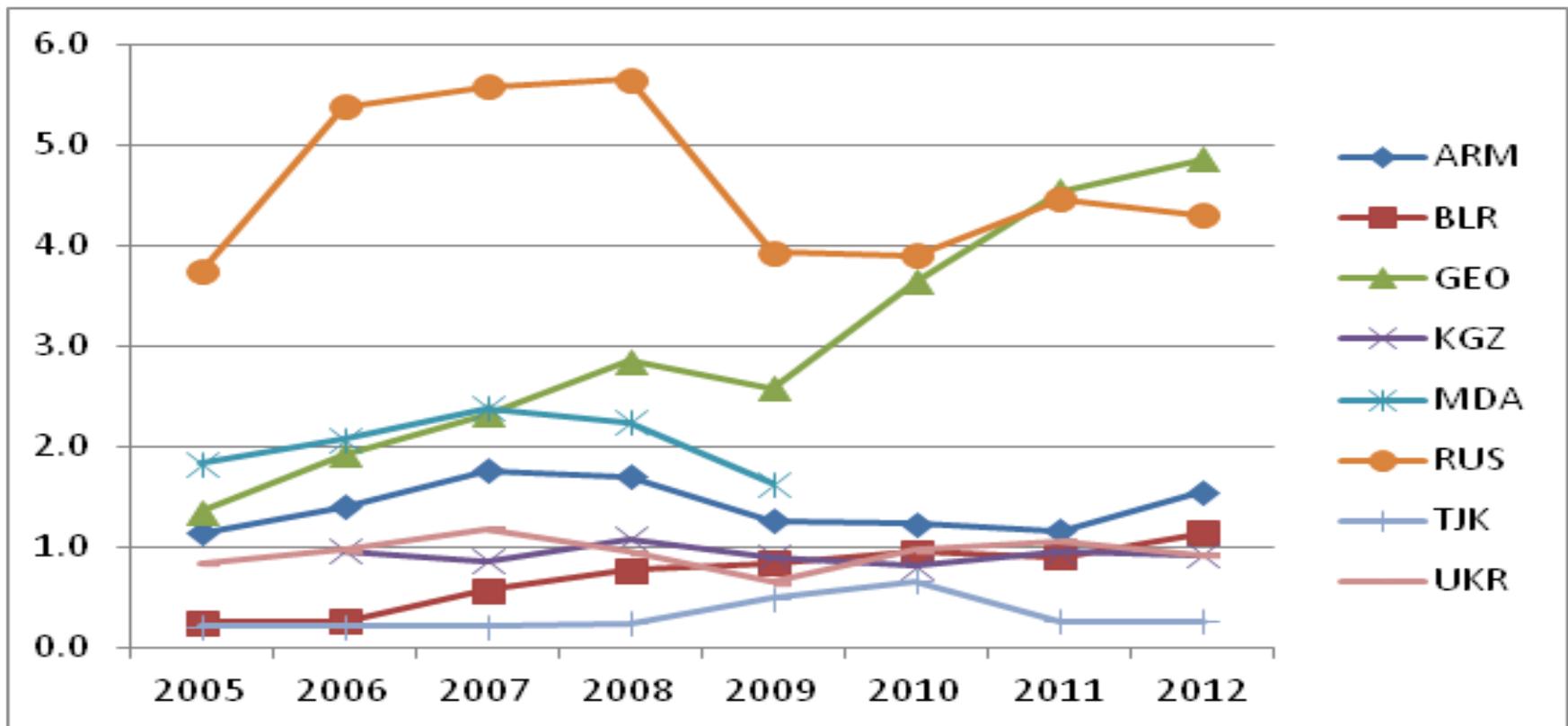


R&D system of Tajikistan is still very much marginal but stabilized at low level

- Its links with higher education are **informal but strong** through joint affiliation of researchers of Academy that are also teachers though the biggest number of teachers is not involved in organised R&D.
- A contribution of R&D is largely in **facilitating absorption of foreign knowledge through contracts of Academy institutes and universities with enterprises** in a wide range of downstream services like consulting, metrology, testing and problem solving.

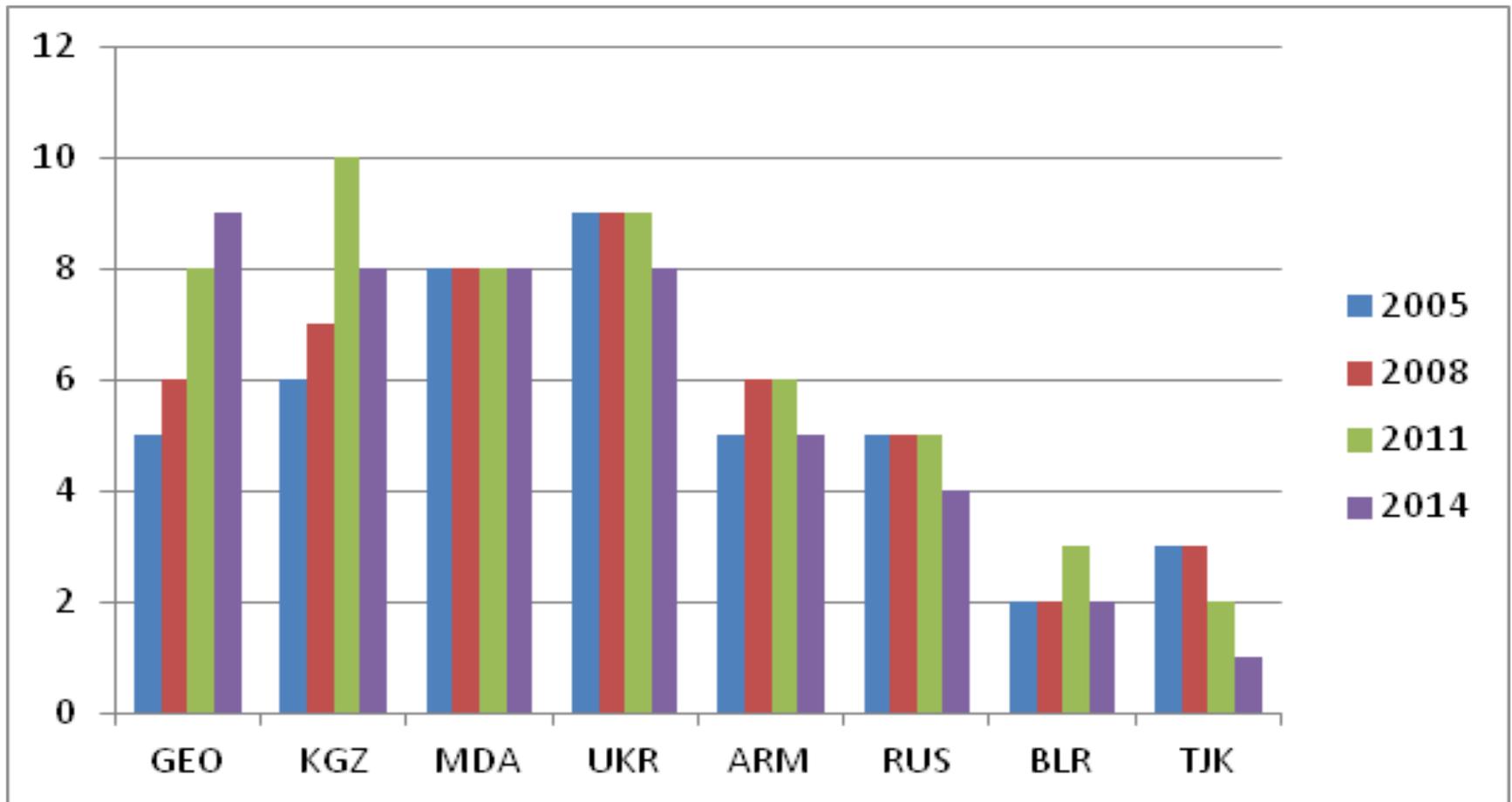
A very weak entrepreneurial dynamics: the number of new business varies annually from 0.2 to 0.3 enterprises or only 2-3 new enterprises on 10,000 of working age people.

New business density (new registrations per 1,000 people ages 15-64)



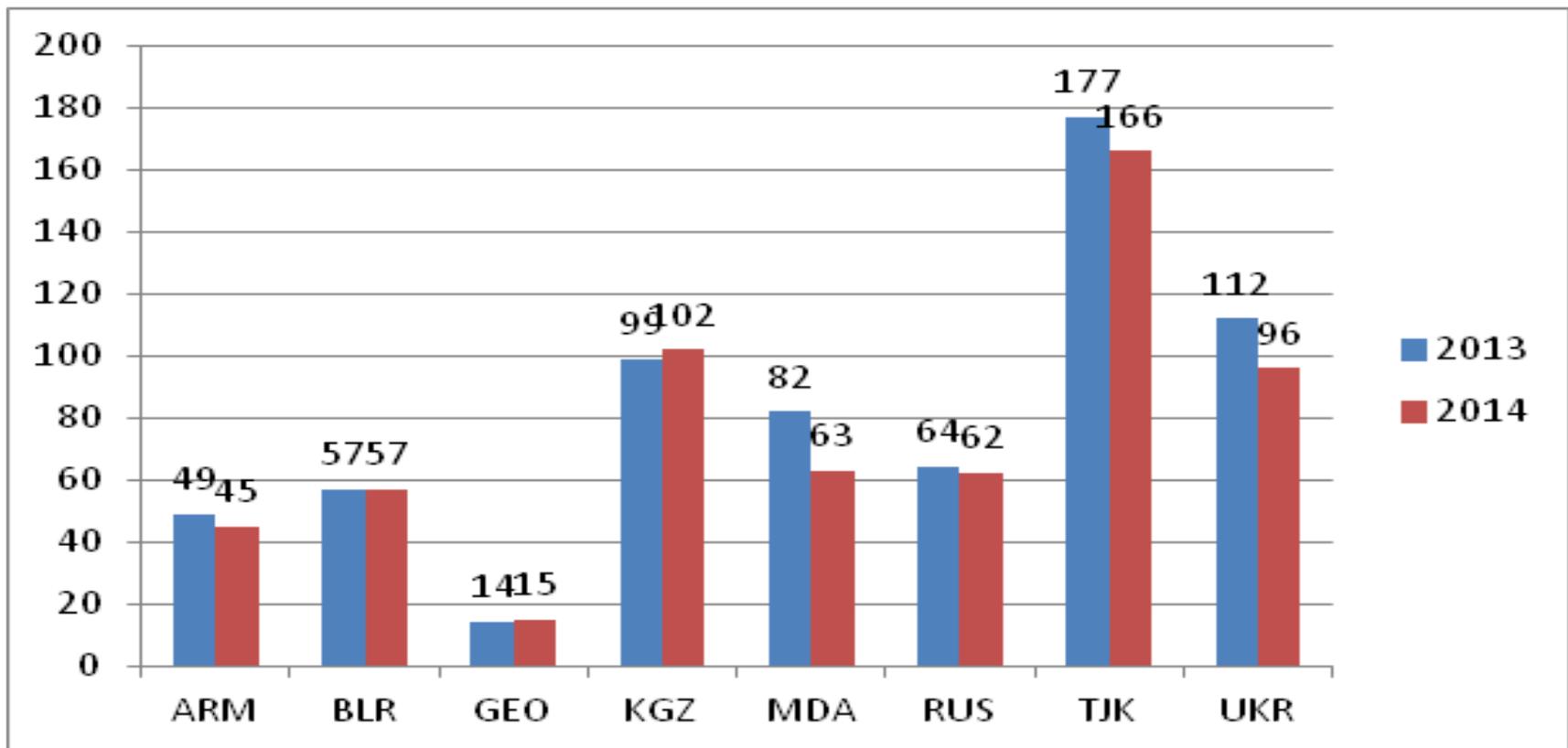
Very poor legal rights: the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending

Strength of legal rights index (0=weak to 12=strong)



Tajikistan has **the most business unfriendly regulations** when compared to its peer economies

Ease of doing business index (1=most business-friendly regulations)



In summary,

- Tajik firms are **excluded from global value chains** and hence their involvement in international standards of management and operational efficiency and safety is almost non-existent. So, there is huge scope for policy action in this area.
- But, surprisingly **high attention of firms to skills of its employees** which is confirmed both in terms of hard and soft data > there is **demand for highly skilled** in Tajikistan
- **R&D system** of Tajikistan is still very much **marginal but stabilized at low level**.
- **A very weak entrepreneurial dynamics and limited legal rights**
- **The business and regulatory environment including financial system** are not assets but **liabilities** in technology upgrading of Tajikistan.
- Major weaknesses in infrastructure, higher costs of trade, isolation from global value chains and FDI despite very low costs of labour. **poor quality of education and skills cannot compensate these cost disadvantages**.
- However, Tajikistan has young population and provided that it takes **strategic view on education and skills** it can develop **new growth model based on local skills, quality and integration into regional value chains**

R1: Improve production capabilities of enterprises

- Given unfavourable geographic location of Tajikistan and the fact that its producers are in start disadvantaged due to **high transportation costs** the only way this can be overcome is by being able **to offer quality which will be able to sustain these costs differentials**.
- In addition, being able to meet **international quality standards** is today the key precondition to be **plugged into global or regional value chains**.
- While this should eventually become national program these activities could be **initiated initially in specific sectors** where there is **critical mass of awareness** that quality is key precondition for exporting.
- Hence, such sectoral program could be initiated in food processing, or in software, or in clothing or metals sectors as these seem to be natural candidates for Tajikistan.
- Support trademarking activities to help build stronger brands
- Encourage vocational, on-the-job and life-long training and learning

R2: Increasing quality of education as strategic modernization project

- Lack of major natural resources, high costs of exports and distance from developed markets **makes skills and education of Tajikistan's people even more important.**
- Given its income levels Tajikistan is investing in education at comparable levels to other comparator countries. However, there are also indices that **quality of its education falls behind**
- University system needs gradually **to introduce world standards of quality in teaching.** Current attempts in direction of introducing Agency for quality of education, accreditation of programs and harmonization with Bologna process, and introduction of credit system are **steps in the right direction.** However, they will produce perverse effects unless quality of teaching does not improve
- There is strong need to establish **program of short and medium term international training programs for teachers.** A strong need for **Tajik version of Bolashak program for teachers** which should be based on highly competitive selection process and on promising career opportunities. This should be **important component of modernisation of curriculum.**
- For this government should approach donors' community and propose **funding agreement based on cost sharing**

R3: Develop strategic approach to FDI

- The identification of suitable inward investment prospects and **the active servicing** of the strategic needs of foreign-invested firms once they are established.
- In view of this constraint **expansion of existing and creation of new free economic zones could help accumulate experience**, attract investors and learn from other countries experiences. In this respect, Tajikistan could benefit from international assistance.
- Offer investment promotion services
- In the case of potentially major FDI investments Tajik government should try to negotiate with investors' arrangements that are based on explicit contracts with their subsidiaries to generate skills that can be useful also for other firms. These should **be cost-sharing partnerships with MNC subsidiaries in order to expand the scale of their training in technical skills beyond their own requirements** in order to increase the pool of skills available to the industry as a whole, involving local HEIs where possible

R4: Support to building basic industrial services linked to export as springboard agenda

- In Tajikistan private supply of business services is still in very early stages. Whether it will be private or the public sector that will take the lead in providing collective and support services for the innovation needs of firms and other actors in local and regional innovation systems is still not very clear
- A strong need to invest in innovation related Specialized Service Infrastructure e.g. **basic investment promotion services, technology extension services, standards and metrology, productivity centers, and information and communication services**
- Establish sector specific **centres for improving productivity** which should work with firms to promote productivity and quality in manufacturing. They should be initially funded by the government to promote awareness of the need to enhance productivity.
- Develop support to **basic industrial services linked to export**; this as an area where a promising policy agenda could be established.
- Create **technology extension services** to generate small but profitable improvements by extending established technology to smaller firms

R5: Direct R&D programs towards demand led issues focused on adaptations to local conditions

- To continue to increase investing in public R&D as a way to support and complement private R&D. However, in Tajikistan public R&D needs to be much more oriented towards improving absorptive capacity of business sector to absorb and effectively use imported technologies.
- The majority of public funding of science should be strongly focused on adaptation of imported technologies to local conditions (agriculture; climate change)
- This orientation towards local relevance of R&D should be built into the R&D funding system through criteria of selection, eligibility and success.
 - E.g. for industry, tailored to local preferences, availabilities of raw materials
 - And for services, tailored to institutional, cultural and legal differences

THANK YOU!