Greece needs a strategy for its transition to an Innovation Economy

by Alexander Kritikos

Although Greece is showing initial signs of recovering from its 2008 crash, its economy continues to suffer. It has become clear that the economy will not become prosperous only by the given recommendations of the so called Troika, namely by cutting costs and public expenditures, and by making institutional reforms, as much as these steps are needed. If nothing else changes, the country will have a steady, tourism-based economy supplemented by a food manufacturing base. However, these components will not yield substantial prosperity increases for the Greek society. At the same time the country has a number of unexploited hidden assets, in particular a small number of excellent research institutes and a great number of top researchers, most of them however working abroad. The central problem is the lack of an innovation-oriented industry structure and of a well-functioning innovation system connecting research output with the demand of entrepreneurs and high-tech start-ups in Greece. Greece needs a strategy for a strong capacity building towards the creation of new applied research institutes. If appropriate research networks are developed out of these and if innovative firms result, creating new products with high value-added, the country has the opportunity to transform into an innovation-driven economy.

The reforms and austerity measures the Troika has suggested to the Greek government lead to substantial reductions of the nominal unit labor costs, of the current account deficit, and of the current public deficit.[1] Beyond these initial reform successes, the current economic situation in Greece is devastating; GDP shrank by almost 30 percent in the past six years, the unemployment rate remains above 25%; and youth unemployment can be called only dramatic.[2]

A raft of policy recommendations were identified and debated, all seeking to help the Greek economy find its way out of the crisis. Institutional reforms, in particular the liberalization of closed professions, further wage reductions, and the privatization of public industries, are meant to help improve the competitiveness of the Greek economy. All recommendations at the same time are implicitly expecting that "the market" will solve the remaining problems. However, six years of recession have made clear that enforcing austerity measures and pushing through desperately needed reforms to the regulatory environment is not enough to create new growth in Greece and transform it into an innovation driven economy similar to other countries in the Eurozone.

Mostly Small Businesses with Low Value Added

An overview of the pre-crisis Greek economic structure (see Table 1) clarifies why Greece is in such deep trouble - see also an earlier DIW Economic Bulletin.[3] Most employees even in the manufacturing sector work in firms with less than ten employees, unable to take ad-

1 Eurostat (2013) Statistics. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

2 Eurostat (2013) Statistics. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

3 Brenke, Karl (2012): Greek Economy Needs Growth Strategy, DIW-Economic Bulletin 3.

Table 1

Share of selected economic activities of gross value added
In percentage and distribution of labor force in the manufacturing sector

	2010			2009	
	Agriculture, forestry and fishing	Manufacturing	Catering and hotel industry	Share of employees in the manufactoring industry in firms with less than 10 employess	Share of employees in the manufac-toring indus-try in firms with more than 50 em-ployess
Greece	3.1	10.0	6.8	46	41
Germany	0.8	20.9	1.6	7	78
Finland	3.0	18.0	1.7	9	75

Quellen: Eurostat (2012); Berechnungen des DIW Berlin.

In Greece there are mostly small businesses, with shares above average in agriculture and tourism.

vantage of increasing returns to scale. Greece is specialized in agriculture and tourism, with both shares above the EU average and the production of food, beverages and tobacco products is the largest single piece of the already small manufacturing sector in Greece – thus in segments with low value added.[4] Therefore, Greece has only a low share of tradable goods and services in GDP terms, resulting in a low average export to GDP ratio of about 25 percent. Greece managed to maintain a closed economy, despite having joined the European Union in 1981, revealing its structural problems. An economy of its size, fully integrated in the EU, should have produced much larger export shares over time.

On the positive side, there are also – albeit few – IT businesses in Greece (getting 40% of all R&D investments)[5] that, along with similarly small scale high tech companies in other areas,[6] might be the nucleus for economic expansion, but are currently too small to develop sufficiently if only institutional reforms are continued.

At the same time little has been done so far to actively support the Greek Economy. Moreover, the private sector still suffers under the highly inefficient and corrupt public administration. The OECD provides composite indicators for instance of product market regulations (see Table 2). Despite some improvements over the last five years, the indicator reflects the numerous regulations, bureaucratic hurdles and restrictions that Greek entrepreneurs and SMEs face. Greece is one of the most regulated economies in the EU,[7] and each decision to enter the market bears a substantial risk of failure because bureaucratic hurdles can be insurmountable for entrepreneurs.[8] In this vein, estimates show that bureaucracy costs about 6.8 percent of GDP in Greece, while the EU average is 3.5 percent.[9]

Table 2

Information on product market regulations

	2008	2013
Greece	2.3	1.8
Netherlands	0.9	0.9
Germany	1.3	1.3
Finland	1.1	1.2
Portugal	1.4	1.3

Source: OECD (2010); OECD (2014).

Greece is one of the most over-regulated economies in the EU.

Similarly the World Bank indicator on the "Ease of Doing Business"[10] reports for 2010 that Greece has an over-

4 See the Report of McKinsey (2012): Greece: 10 years ahead: Defining Greece's new growth model and strategy. Athens.

5 Grant J, Ling T, Potoglou D, Culley DM (2011) A rapid review of the Greek research and development system. Rand Europe.

6 McKinsey Report (2012), a.a.O.

7 OECD (2008) Product Market Regulation. http://stats.oecd.org/Index.aspx?QueryId=28994.

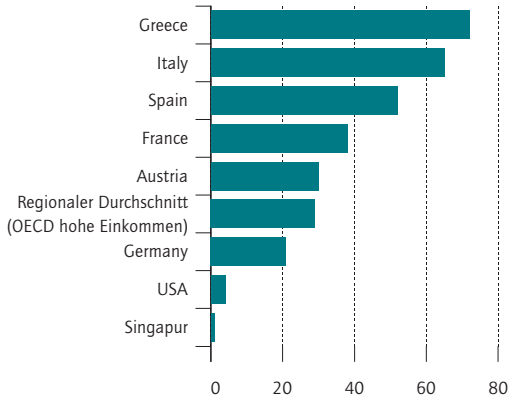
8 For a real life example see the start-up story presented in the New York Times from 29.1.2011: What's Broken in Greece? Ask an Entrepreneur. http://www.nytimes.com/2011/01/30/business/30greek.html?pagewanted=all&_r=0

9 Drymiotis, A. (2012): The Monster of Bureaucracy and What it Costs, Kathimerini, December 22.

10 World Bank (2010): http://www.doingbusiness.org/rankings.

Figure 1

Ease of Doing Business 2013

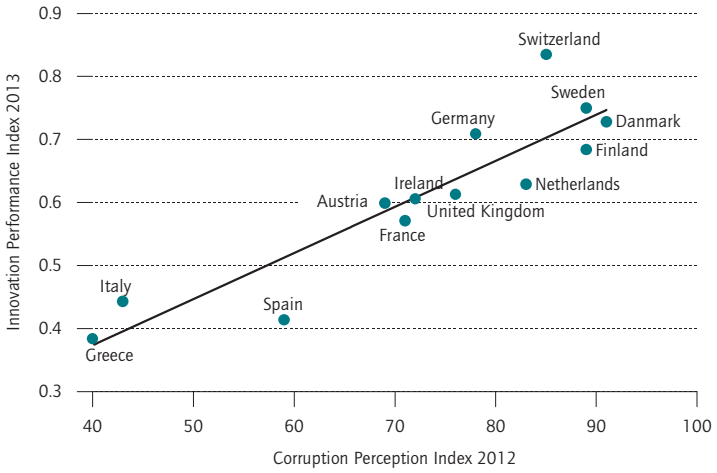


Source: World Bank (2014), www.doingbusiness.org/rankings.

Greece is ranked 72th out of 183 countries, far below any other Euro-zone economy.

Figure 2

Innovation Performance and Corruption



Source: Innovation Union Scoreboard (2013), Transparency International (2013).

A higher corruption perception index corresponds to a lower level of corruption in a given country. Greece ranks lowest at the Innovations Performance Index" and has the highest level of corruption.

regulated legal framework that puts substantial burdens and lengthy procedures on its entrepreneurs and business owners regarding entry regulations, property registration and obtaining or extending licenses or permits, as well as reporting duties, as measured by the Greece ranked 109th out of 183 countries, far below any other Euro-zone economy. Despite reports of incremental improvements in the business climate, the Greece's indicator rose to 72th in 2013 (see Figure 1), it is obvious that the reforms have not been sufficient so far. For instance, foreign direct investment as one critical indicator for the openness and innovative environment of a country still shies away from Greece; this money is allocated to countries with more attractive investment conditions.[11]

This leads to the last crucial issue: Corruption, the other side of the coin of over-regulation, is part of everyday life, like the bribery of bureaucrats, tax collectors, and judges. Greece is considered to be the most corrupt Euro-zone country (Figure 2). Corruption is not just detrimental to the economy in general, but specifically to innovation and entrepreneurship. Corruption is one reason why researchers and innovators stay away or leave. Recent investigations cannot find evidence of changes in the level of corruption.[12]

In a nutshell: the analysis makes clear that Greece does not have a cost problem (anymore), but fundamental institutional and structural problems. Cutting costs will make Greece more competitive, but at a wage level below European standards. If Greece is to make growth progress within the group of Euro-zone countries, it must move beyond institutional reforms.

Greece invests only small amounts into R&D

Tourism and agricultural products will remain an important part of Greece's economy, but in these sectors products and services of mostly low value added are produced. It is certainly possible to make the existing products (food and beverages) more innovative and it is also possible to increase the quality of offers towards tourism. The McKinsey (2012) report has shown several ways how this could happen. But tourism and agriculture will not be enough to create sustainable, growing wealth for the whole country. Greece has to tackle the central problem of moving up on the value-added scale. The key to such transformation is developing an innovation-orient-

11 Evans-Pritchard A (2012) Debt Crisis: Greek Euro Exit Looms Closer as Banks Crumble, The Telegraph, May 16.

12 See the recent report of Transparency International (2013), which ranked Greece as 80th in the world in its 2013 report, and found no evidence of improvement. For further information see the Corruption Perception Index. Online: http://www.transparency.org/cpi2013/results.

ed industry structure and a well-functioning innovation system. And we should not forget that Greece is part of the Euro-currency, a group of countries driven by innovation, including Finland, the Netherlands, Germany, and France, but also Belgium or Austria. These Eurozone economies invest around 3% of their GDP into R&D, thus into their innovation systems. Their major aims are to finance excellent basic research institutions, to make sure that there are constant links and flowing transitions from the outcomes of basic research to publicly financed applied research, and to support stepwise spillovers from ideas to innovative products, which need proof of concept, market demonstrations and commercialization.[13] What seems even more important: many other Eurozone countries have agreed on a political consent that these investments are of crucial importance no matter which party is in control. The budget is set and the scientists are given wide latitude to do their work. As a result, their economies are driven by innovation and continual refinement, with new products and technologies regularly introduced. They are successful in the global markets because of their new technologies and not because of their low unit wage cost.[14]

The Greek economy does not. Its investments into R&D amount to 0.67% of GDP, less than any other Eurozone economy and far below the EU average. In addition, private R&D investments make up less than 0.2% of GDP. Sweden, at the other end of the scale, allocates 3 percent of GDP to private R&D.[15] Research networks barely exist in Greece and collaboration with industry is poor. Also, when it comes to abilities of handing launches of new products, Greece again finds herself at the bottom of rankings on management practice scores.[16] No wonder that in the "innovation performance index" prepared by the European Commission, Greece ranks far below any other Eurozone country. (see Figure 2).[17]

Greece is not making use of its hidden assets

Overall this picture does not seem to be encouraging for the vision of an innovation driven economy. However, there are some hidden assets in Greece which have been substantially underappreciated in the analysis of its economic prospects. The first asset is the small number of mostly basic research institutes that produce considerable research output.[18] A second hidden asset is that there is a huge number of top Greek scientists. The share of top Greek researchers among all researchers in the world is above 3% while the Greek population among the world population is only 0.2%.[19] However, Greece is "exporting" 85% of these top scientists, more than any other Eurozone country, to research institutions outside of Greece, to other European Member States and even more of them to the US. Similarly, when focusing on ERC grants (the most competitive research grant of the European Research Council) which is another indicator for research excellence, and averaging Greek researchers (in Greece and in Europe) over the Greek population we observe that the ratio of grants to the population is comparable to innovation economies like Finland, Germany, or Great Britain and better than the ratio for Spanish, French or Italian researchers (see Figure 3).[20] This holds even without taking account of the majority of Greek Diaspora scientists working at institutions outside the EU. If this "brain power" could be unleashed within Greece, the country could turn more quickly into an innovation driven economy.

Third, Greece also has a few innovative companies – a large share of them in the IT business - that have remained in Greece. These firms do sporadically work with the existing research institutes, but are not clustered and co-located in the same area, despite the obvious potential for mutually beneficial cooperation. Some of them have developed new ideas that are on the cusp of being turned into marketable products. [21] These firms have remained in Greece despite the adverse innovation environment.

13 See for instance Nelson, R.R. (1993): National Innovation Systems: A Comparative Analysis, Oxford Univ. Press, Oxford.

14 Ample research demonstrates why it is worth developing an innovation friendly environment with support for innovative firms. (See Aghion, P., Howitt P. (1992): A Model of Growth through Creative Destruction, Econometrica 60, 323-51.)

15 Eurostat (2012): http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes.

16 See Bloom, N., Genakos, C., Sadun, R., van Reenen, J. (2012): Management Practices across Firms and Countries. Academy of Management Perspectives 26, 12-33. They have developed a measure for good management practices and have presented a ranking on the quality of management practices differentiated for countries.

17 Innovation Union Scoreboard (2014): http://ec.europa.eu/ enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/.

18 Grant et al. (2011), a.a.O.

19 See the study of John Ioannidis „The Best Greek Scientists Exiled from Greece" (2014); http://greece.greekreporter.com/2014/08/01/the-best-greek-scientists-exiled-from-greece/

20 Also among ERC Grants 45% of the approvals have been allocated to Greeks in Greece and 55% to Greeks in other EU member states, see Ben Herrmann und Alexander S. Kritikos (2013): Growing out of the crisis: hidden assets to Greece's transition to an innovation economy, IZA Journal of European Labor Studies 2013, 2:14, http://www.izajoels.com/content/2/1/14.

21 Tsiros G (2013) Greece innovates, joint publication by Eurobank Greece and SEV. Athens.

This brings us to the fourth "hidden asset" of Greece: Its attractiveness in terms of climate and quality of life. In an increasingly global race for the best talents, life quality outside labs turns into a crucial success factor. Labs, researchers, patent lawyers and venture capital can move easily, while climate, landscape and historical heritage cannot. Some outstanding research universities in northern Europe and the northern US have already experienced the problem of competing against universities in places of higher quality of life, like California, Australia, and Israel. Europe so far does not dispose of a "global attractor" where world-class academic research is matched by locations with attractive climate and quality of life. In this respect Greece has a unique comparative advantage to most EU members and could make a significant contribution to Europe's collective problem of lacking the combination of places with internationally competitive employment conditions and attractive life quality. If quality of life is matched with excellent research and public administration, Greece could become an attractor not only for tourists but also for talents.

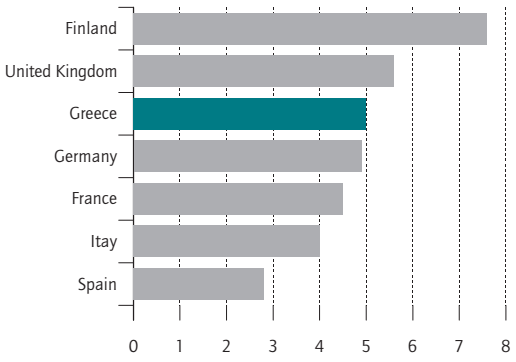
However, drawing these arguments together, these hidden assets are currently almost not used. Instead, given the high regulatory burden and the unfriendly environment toward innovative companies in Greece, there are only a scattered number of high-tech start-ups and no knowledge transferring institutions or applied research connecting the existing basic research institutes with the potential of later exploitation of their fundamental findings. And instead of spin-offs from universities and networks between researchers, institutes work rather in an isolated way with the majority of their top researchers leaving the country, while it is still kind of taboo in the Greek society to turn research results into business ideas.

An Agenda for Innovation in Greece

Several factors are required to design the transformation to an innovation-driven economy. To attract, train and retain talented people and to give researchers, entrepreneurs and managers a fitting structure enabling them to make their specific contributions within an innovation chain, economies need appropriately developed innovation systems. These consist of high quality schools, universities and independent research institutes, as well as professional education systems and excellent research within the public sector. It further needs a functioning financial sector, informal and formal institutions, as well as non-exploitative networks and locally and thematically organized clusters. Last but not least, it also needs a suitable regulatory environment that facilitates internal markets open to new products and international competition. In the center of these approaches is thus the exchange and knowledge transfer between the world of research and the world of business, making new products out of research ideas.

Figure 3

Average Ratio of ERC Grants of researchers of a certain country in relation to the country's population



Quelle: Herrmann und Kritikos (2013).

The ratio of Greek top researchers to the Greek population is similar to other innovation driven economies; only the majority of top Greek researchers is using the grants outside of Greece.

A good starting point is that Greece does not have to build an innovation system from scratch. If political decision makers would start developing a strategy for the extension of the Greek innovation system to provide Greek talents with the necessary support and to attract talents from other parts of the world to Greece, they can rely on existing research institutes and entrepreneurs willing to venture innovative firms. The first and foremost need in such a strategy is to close the gap in the innovation chain of Greece, thus between basic research institutes and innovative businesses, by making substantial investments into publicly financed research and into the capacity building of new research institutes, and by clustering them around the existing research institutes. Further, institutions which create networks and clusters, protect (intellectual) property rights, and streamline bureaucracy will allow Greek entrepreneurs to introduce new marketable products or processes in Greece instead of in other countries. Related to the systemic and institutional factors of an innovation system, and the status quo of these factors in Greece, the following steps are recommended:[22]

22 For a discussion of the policy measures, see Herrmann und Kritikos (2013).

Establish and develop new research institutes

Given the specialization of the existing research institutes and universities on the one hand, and the traditional (agriculture and tourism) and modern (IT, pharmacology, energy, nanotechnology) sectors on the other hand, the research capacities need to be substantially extended with a strong focus on creating spatially bounded knowledge spillover. More specifically: a substantial number of new research institutes with a strong focus on applied research need to be created, developed and clustered in a way that they close the gap in the innovation chain. Given that such a strategy needs a strong increase of public investments and given the current state of the Greek national budget, the European Commission provides in the Research Framework Programme Horizon 2020 and with the structural funds and the smart specialization strategy several new tools that will help Greece to finance these investments. Ideally, these investments are accompanied by a restructuring of the public research system.

Create incentives for Researchers to stay in or come to Greece

The most important resources for generating an innovation economy are the researchers working for it. Well-educated researchers are the driving force behind cutting edge research, new developments, and innovation. In order to be able to compete with research institutions elsewhere in the world, Greek stakeholders must remove the barriers that discourage Greek researchers from staying home and other researchers from coming to Greece. Thus, working and research conditions have to be designed appropriately to turn the brain drain into brain circulation. Attractive conditions contain three aspects: (a) independent research with the only target of top quality research output; (b) salaries that compete with similar institutions in Europe; and (c) a low regulatory burden for starting research in Greece.

Expand research clusters based on existing specialization

When founding new research institutes, it will be of crucial importance to focus their new research in areas where Greece is specialized in. Clusters will be particularly successful in terms of knowledge spillovers when research institutes, universities and innovative companies are geographically concentrated.[23] In this context the Greek government has to rethink the geographical reallocation of its scattered research institutes and to allow private businesses to establish their firms next to the research centers. Furthermore, the technology park infrastructure, built in the past with the help of Structural Funds from the European Union, should be re-activated. The main aim of such clusters is the linking of science with business, and the composition of knowledge spillovers from public research institutes to private firms and businesses. Therefore, there is central need for applied research institutes (such as the German Fraunhofer Institutes). In particular these institutes are able to provide knowledge-based solutions to the special needs of technology oriented start-ups aiming to place innovative products in the market. At the same time spin-offs are often established around applied research institutes when their researchers aim to transform their own research ideas to products.

Independence of Research from Politics

The Greek research landscape is strongly determined through political interventions. Investments into research institutes and universities will, however, only work in the sense of being attractive to top researchers if universities and research institutes become independent from political influence. Ministers and MPs need to step back, only providing an overall budget and then leaving for instance the selection process of new researchers to internationally recognized scientists. This process can be supported by an independent research organization providing research grants only on the basis of excellent research quality.

Strengthening efforts to cut red tape

Despite the incremental improvements in the business climate, as shown in the World Bank 2014 report, regulations are still very high for firms in Greece, hindering or imposing substantial cost to both innovators and researchers who are seeking to commercialize their invention through new business ventures. And innovative companies are the first to leave if institutional reforms are not continued. Administrative efforts for entrepreneurial activities need to be substantially reduced. This should include not only reducing the number of days needed to register new businesses, but also the number of bureaucratic steps involved in this process, as well as the number of regulations, fees and reporting duties while running a business. Last but not least, there are

23 Ellison, G., Glaeser, E.L. (1999): The Geographic Concentration of Industry: does Natural Advantage Explain Agglomeration, American Economic Review 89, 311-316.

similar barriers to close a business which need also a major reform. Instead of relaxing on its improvements Greece needs to become one of World Bank's top 20 when it comes to "Ease of doing business," as a couple of EU-countries recently succeeded to do. Moreover, all reforms approved by legislation and those reforms that still need to pass parliament will only become effective once implemented and enforced by courts. To support the necessary adjustment processes, administrative officials need to be appropriately trained.

Incentives for regional and local authorities to attract new firms

Greek municipality leaders are excluded from business revenues produced in their municipality, reducing thereby their interest in caring for the local business climate. For successful innovation economies, municipal leaders committed to create an excellent local business climate (efficient, fast administration, excellent primary and secondary education, and good health services) are essential as they create "hands on" the right environment for innovative entrepreneurs. In most successful innovation economies, municipalities are therefore entitled to a share of the locally produced tax-income, rewarding their efforts to create an attractive business environment. The central authorities in Athens therefore need to give away control over certain taxes which could be raised by municipalities.

Diaspora Policy

All measures discussed so far aiming to close the gaps in the innovation chain can be supported with a target-oriented Diaspora policy. Currently, the Greek Diaspora, although very strong, is not treated as an asset. Beyond the goal of creating a specific labor market policy for recruiting talented individuals abroad, the Diaspora policy should open interaction and cooperation between those who go abroad and those at home. This could include options for creating exchange programs for top researchers turning the brain drain to brain circulation for increasing knowledge transfers, for financing R&D, for attracting risk capital, increasing management capacities, or even for export promotion of innovative products produced in the homeland toward the Diaspora. Thus, the goals of Greek innovation policy can be substantially accelerated if accompanied by a target oriented Diaspora policy.[24]

Conclusions

Greece's Euro-zone membership may have given the false impression that the economy might be driven by innovation. The Greek economy is not – it faces not only institutional but also severe structural deficits with a small industrial basis, low export ratio, small businesses and many closed professions. If decreasing labor costs and further institutional reforms were to be the only active policy, then Greece's future would be a low wage economy with an extended workbench of other innovative economies. Greece can only become prosperous if it also uses its further comparative advantages in addition to tourism, trade and agriculture.

Greece has a foundation of high quality research institutes at the beginning of the innovation chain, a handful of innovative companies who remained in Greece despite the high regulatory burden, as well as an impressive Diaspora in research, finance and business. Greek authorities need to make substantial investments into the capacity building of new research institutes, accompanied with further institutional reforms, a design of instruments to support knowledge spillovers from research to business, and an appropriate Diaspora approach in order to create an innovation policy which closes the gaps in the innovation chain. By doing so, the number of innovative companies would substantially increase, thus allowing Greece to find a path towards sustainable growth. However, if Greek authorities rest on their laurels of having slightly improved the institutional surrounding, researchers, businesses and capital will continue to stay away.

To this end we propose an innovation agenda designed to turn Greece into an innovation-based economy. However, Greek decision makers must make clear that embarking on an innovation centered policy will not result in an instant improvement in the Greek economy – indeed it will take one decade at the minimum. However, the time to start is now, as the earlier these reforms are put into practice, the sooner the country will enter a sustainable economic growth path.

Of course, whether or not Greece actually becomes an innovation hub depends not just on investments into R&D and research centers, but also on establishing a partnership between the worlds of research, business and entrepreneurship, where ideas can be freely exchanged. Greek Ministers and MPs, regardless of party, must commit to investing time and money, formulating a vision that inspires young Greek entrepreneurs, scientists, and citizens. They must also take concrete actions that signal a serious commitment to innovation. Combined, these efforts may become key to creating trust in the Greek po-

24 Plaza, S. (2013): Diaspora Ressources and Policies, in A.F. Constant and K.F. Zimmermann (eds.): International Handbook on the Economics of Migration, Cheltenham, Edward Elgar, 505-529.

litical system. If the Troika should decide to actively support this process, she would be enabled to successfully accomplish the still necessary reforms. To that end the future discussion between the Troika and Greece needs to be refocused on the Greek capabilities.

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