

Center for Strategic Studies under the
President of the Republic of Azerbaijan

Geo-Economics

Vusal Gasimli

Praise for *Geo-Economics*

Recent events around the world, from the Arab Spring to the war in the Ukraine, have demonstrated the importance of geo-political factors for the world economy. At the same time, the interplay between economic factors such as productivity, innovation, and growth on the one hand, and concepts like border-redrawing, the shifting balance of power, and national security, on the other, has not received the attention that it deserves in the literature. Dr.Gasimli's novel analysis in "Geo-economics" provides a unified, up-to-date, and insightful guide to the field. Students, academics, and policy makers will find this book to be an invaluable companion. The chapter on water and water scarcity is particularly well placed, as water is bound to become the most important commodity in the not too distant future. Last, but not least, the book contains a self-contained treatment of the most important issues related to energy.

Ted Loch-Temzelides,

Professor of Economics, Rice University, the U.S.

Also by Vusal Gasimli

Resource-rich countries:
Modernization and
Diversification

Economic Modernization

Green Development



Vusal Gasimli

Assoc. Prof. Dr. Vusal Gasimli works as a Head of Department in the Center for Strategic Studies under the President of the Republic of Azerbaijan. He was president of “ANS-PRESS” Publishing House from 2005-2007 and expert in the European Union in 2009-2010.

He graduated Azerbaijan State Economic University and received his Master degree in Economics in 1997. He received his MA in journalism from the Georgian Institute of Public Affairs (based on the study program of Louisiana State University) in 2004. He received PhD on Economics in Baku in 2009.

Being a results-driven researcher with strong background in macro-economics, he focuses his studying on the economic development, competitiveness, modernization and agriculture. In recent years, he has hosted and participated in more than 20 academic research projects, published about 500 articles, wrote or co-authored 10 books.

Recent book of Dr. Gasimli entitled “Resource-rich countries: Modernization and Diversification” was printed by German Academic Publishing House in 2013.

Dr. Vusal Gasimli got the award of Astana Economic Forum for outstanding research achievements in 2012.

He worked as a guest scholar in Korea Institute for International Policy in 2013.

Assoc. Prof. Dr. Vusal Gasimli delivered lectures at prestigious universities such as Washington, California, Hanyan, Milan Catholic, Warsaw, Hankuk, Cairo, Rio de Janeiro *etc.*

He knows Azerbaijani, English, Russian, Spanish (elementary proficiency) and Turkish.

More information on Dr. Gasimli can be found at <http://sam.az/en/about/staff/>

This book is dedicated to the memory of Heydar Aliyev, national leader of Azerbaijan. There are many reasons to honor his memory, not the least of which is the fact that he led so many geo-economic projects, such as the Baikal–Amur Mainline, the Baku–Tbilisi–Ceyhan pipeline, the Europe–Caucasus–Asia Corridor, and others, all of which have contributed to interconnecting Eurasia, the world’s biggest continent. Today, one of the biggest stations of the Baikal–Amur Mainline and the whole of the Baku–Tbilisi–Ceyhan Pipeline are named in honor of Heydar Aliyev.

Contents

I

Introduction - 9

Chapter II

Geo-Economic Recalibration - 23

Chapter III

Geo-Economic Heredity - 47

Chapter IV

Unicurrency - 53

Chapter V

Geo-Economic Redrawing of the Energy Map - 71

Chapter VI

Hydronomics - 111

Contents

Chapter VII

Oil Prices and Geo-Economic Shifting - 121

Chapter VIII

Geo-Economic Shifting - 149

Chapter IX

Innovation-Led Development - 159

Chapter X

The Impact of Certain Key Factors on Labor
Productivity in European Countries - 165

XI

Conclusion - 181

References - 190

1. Introduction

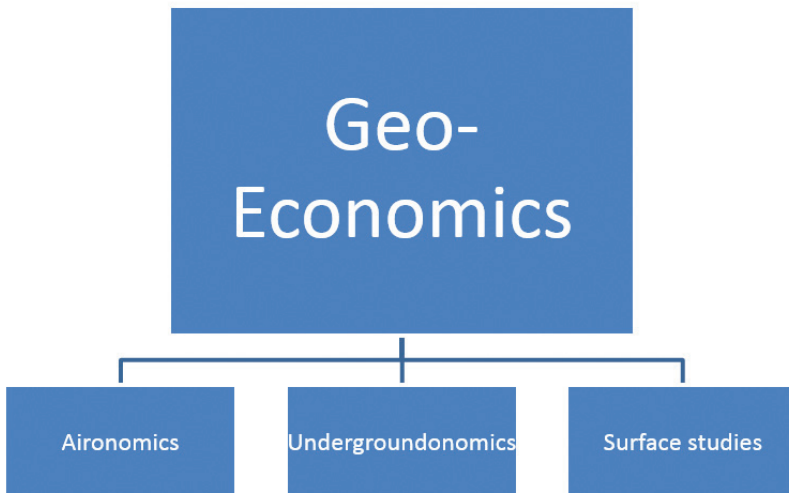
Why has geo-economics become so important in the late 20th and early 21st centuries? Because after the discovery and era of nuclear weapons—with their enormous destructive power and ability to act as a tool of deterrence—a non-military approach became more an actuality. Although brinkmanship was the general concept in the last century between the 50s and 80s, beginning in the 80s, some researchers coined the term “geo-economics” without clearly identifying this paradigm. It was just a fluke that the term “geo-economics” was uttered the first time by Edward Nicolae Luttwak, an American military strategist.

Geo-economics has been recognized as one of a range of non-military tools. When I began my in-depth study of this field, I discovered that it needs more scientific and systematic delineation. Thus, to provide a narrative on geo-economics—a rather non-specific and amorphous subject—in a lively manner, to analyze how it is determined, and to try to shape it as a field of scientific investigation has been our academic target. Now it is your turn, Dear Reader, to pass judgment on I edition of this book. I have done my best to make this book reader-friendly, even light and enjoyable.

Economics, politics and geography have influenced each other throughout the history of humanity. Geographical placement determines the existence of natural resources, territory, distance, climate and other important factors in economic development. In other words, geography is a determining factor in the environment surrounding economics. Such interrelations

give rise to geo-economics — the study of the interconnection between geography and economics. When speaking of the geographical impact on economics, we refer to what is both underground and on the surface, including the space on the surface. Thus geo-economics is the study of the interrelations of economics, geography and politics in the infinite cone rising from the center of the planet Earth - apex, to the infinity of the universe—to the extent that this is possible. Geo-economics has three directions: 1) Aironomics—covers the infinity of the universe from the surface of the Earth. The Earth's air, moon, and other achievable bodies and space itself are the object of aironomics. 2) Surface studies include land and water surfaces. 3) Undergroundonomics studies resources underground.

Figure 1.1. The directions of Geo-economics



Why do states pursue power? Mearsheimer (2001) argues that three general patterns of behavior are the reason: fear, self-help, and power maximization.

Acemoglu and Robinson (2013) criticize the geography hypothesis, which states that economic differences between countries derive from geographical diversities. They also pass judgment on Diamond's theory, which claims that the origins of intercontinental inequality at the start of the modern period, 500 years ago, rested upon different historical endowments of plant and animal species. Acemoglu and Robinson (2013) argue that Diamond's thesis is a powerful approach to the puzzle on which he focuses, but it can't be extended to explain inequality in the modern world. They also attempt to highlight the importance of inclusive institutions that lead to economic prosperity.

It should be noted that neither Acemoglu and Robinson's (2013) explanation, nor Diamond's theory is well-equipped to elucidate the nature of the problem as a whole. They give only a one-dimensional explanation, which doesn't mirror the multifaceted reality of economic development.

To this end, both approaches might be combined: institutional and geographical endowments are among the independent variables of the development function. Depending on the time, one or another variable has had more impact on economic development. However, the number of regressors can't be restricted just to

institutional and geographical endowments. There are a multitude of other explanations, as well as regressors, such as the culture hypothesis and ignorance hypothesis – all put forward by various scholars and pundits. Thus the variables mentioned above, if combined in a positive manner, can unite to create a powerful boost to an economy. While not attempting to explicate every aspect contributing to economic prosperity, we have posited questions to the mentioned assumptions. The thrust of our research necessitates that we focus on only one side of economic development — geo-economics. Therefore, the following pages provide interdisciplinary and global perspectives on geo-economic issues.

Former Secretary of State Kissinger’s statement, “Control oil and you control nations; control food and you control people,” hints at the significant role of geo-economics. Within our knowledge economy, the power of technology alters the rules of the geo-economic landscape, undermining conventional tools of control that Kissinger mentioned. The industrial and information revolutions beg for ways to redraw the layout of the geo-economic landscape.

In addition, multidimensional processes, such as new regionalisms and globalization recalibrate the balance of geo-economic powers. Unipolarity based on the dominance of the U.S. has succeeded the Cold War bipolarity under the Soviet Union and the U.S. Zakaria (2011) states that the summer of 2002 will be

seen as the high-water mark of unipolarity, America's Roman moment: "The economy was roaring, productivity growth was higher than it had been in decades, Washington was churning out massive surpluses, the dollar was sky-high, and American CEOs were global superstars." In the 1870s the U.S. GDP overtook that of the U.K. Before that time the U.K. was the largest global economic giant in terms of the scale of its GDP, worth in that year (1870) \$104,011 million US (1990 real dollars), while the U.S. generated a GDP equal to \$98,303 million US. However, by 1890 the U.S. had a GDP worth \$214,714 million US (1990 real dollars), compared to the U.K.'s \$151,998 million US.

Furthermore, the U.S. was the first power beyond Eurasia to hold sway over the globe. Before that, all superpowers had originated in Eurasia: the Hun Empire, the Roman Empire, the Sassanid Empire, the Caliphate, the Ottoman Empire, the Mongol Empire, Great Britain, the Russian Empire, the Spanish Empire, the Portuguese Empire, *etc.* At present, the rising power of China and that which is seen in a resuscitated Russia has been causing disorder in unipolarity, paving the way for tripolarity.

Putin, president of a country of 145 million Russians spanning 16 time zones that sprawl across Eurasia, considers that a new world order must be written together by the major global powers. Meanwhile, the U.S. is trying to avoid being derailed as a superpower. But the emerging economies of Brazil, India, Mexico, Turkey and others look likely to open the door for multipolarity

for the world in the long-term and will be another nail in the coffin of American primacy. The world order is standing at the dawn of new era.

For example, the BRICS (Brazil, Russia, India, China and South Africa) are subtly organized in a manner to curb U.S. global exuberance. After the BRICS, the members of MINT (Mexico, Indonesia, Nigeria and Turkey) are also countries who aim to be global powerhouses. One point the former Goldman Sachs economist Jim O'Neill makes about these countries is their location: Indonesia is at the heart of Southeast Asia, Mexico benefits from proximity to the U.S., Turkey has its combination of eastern and western attributes, and Nigeria is the most buoyant illustration of a rising African continent. Mexico, Indonesia, Nigeria and Turkey are looking to “make a mint.”

Geo-economic competition is even present in the northernmost and southernmost areas of our globe — the Arctic and Antarctica respectively. Thus the expression “polar geo-economics” may become appropriate. But geo-economics as a newborn science should encompass and explain the laws of development objectively.

Nobel Prize winner *Paul Krugman* has stated that the Iraq war will end up costing well over \$1 trillion. That is more than the GDP of Indonesia, the *largest Muslim majority country*. *Conventional war is no longer the right way to achieve hegemony*. Geo-economics

is considered one of tools of “hybrid warfare,” which blends conventional and unconventional strategies. For example, the *Eurasia Daily Monitor* has reported that the Ukrainian crisis may promote the emergence of a new world order that would sideline Western democratic nations and recognize Russia’s own sphere of undisputed influence in the post-Soviet Eurasian land mass.

From this perspective, the annexation of Crimea can only be considered part of a long process. The Ukrainian crisis, beginning in Maidan, has been translated to an interference in the affairs of others by promoting so-called democracy and human rights, resulting in a geo-economic conspiracy that is trying to deprive Russia of its best ally — high oil prices. At present, economic and financial sanctions, manipulations of commodity (especially oil) markets, currency wars, etc., could be considered geo-economic tools for achieving power or economic advantage, formerly achieved through warfare. Another example is that early in 2014, as a countermeasure over U.S. sanctions, Russia threatened to shut down GPS stations that had been developed by the U.S. Department of Defense within its borders. The U.S. authorities, relying on the opinion of Pentagon experts, then refused to allow Russia to place on its territory five monitoring and differential correction stations for Russia’s GLONASS satellite system, which uses a series of satellites that provide location data.

Geo-economic recalibration is the precursor of the new world order that will point in two directions. First, international and

regional organizations (UN, IMF, WB, WTO, etc.) will be reformatted. Second, geo-economic recalibration might lead to the establishment of new global and/or regional formats (AIIB, BRICS Bank, etc.).

In the case of climate change, the energy sector, from its sources to consumption, is changing dramatically. In this book we analyze the key issues affecting energy companies today, such as political and economic risks, emerging global supply/demand centers, new technological developments, resource nationalism, and the impact of global climate change policies on various sources of energy. In former times, the Middle East was considered the main source of energy, while industrialized countries have been the largest consumers. At present, to the contrary, the world's energy map is being redrawn. The U.S. and Australia lead the shale revolution, becoming no less important energy sources than the Middle East. China and India's surging energy consumption is becoming as significant as that of industrialized countries. Saudi Arabia intends to remain the largest petrochemical giant. So the supply and demand geo-economic vectors are changing. Along with this shifting in the field of supply/demand of energy, many means of transportation have been undergoing revolutionary change as well. Energy security, control of major land and sea transportation routes and technological breakthroughs fuel "energy nationalism," which, in turn, is painting a new geo-economic palette.

In the second chapter the main result is that in the runoff the winners will be those who rely on technology and science, and effectively transform their institutions. The comparison of Mongolia and Singapore reveals the other reality of geo-economics: while in the past, the vastness of territory was privilege, as for the Mongolian Empire, in present times, Singapore's strategic location creates opportunity to receive international (western) support to counterbalance China. Either the vastness of territory or a strategic location that fuels a counterbalance policy are factors of geo-economics.

In the third chapter **geo-economic heredity** and **nippers effect** are explained. You meet very interesting topic with new paradigms in the mentioned chapter.

In the fourth chapter coordination of mid-term and long-term fiscal and monetary goals and single world currency are in the focus. Without strong commitment to the coordination of mid-term and long-term fiscal and monetary goals among states around the world and, where relevant, to delegate partial authority to independent intergovernmental councils, sustainable improvements in fiscal and monetary performance will remain elusive. Existing fiscal and monetary performance around the world excludes the impact of fiscal and monetary policies beyond national borders. The point is that each government's fiscal and monetary policy has direct, indirect, and induced effects across borders. From that perspective, positive fiscal and monetary policy within national

borders could create negative impacts on others beyond borders (like bailout programs to protect domestic markets). The extent of the impact deriving from fiscal and monetary policy is correlated with the convertibility of national currency, economic scale, trade openness, military presence, etc. My advice grounding on the topic of this chapter has been included in G20 bi-weekly and is publicized through the platform of Chongyang Institute for Financial Studies (China) to reach G20 leaders.

In the fifth chapter we don't agree with Calder (2012), who describes natural resources, especially physical energy deposits, as immobile, in contrast to services or light manufactures. Globalization and new transportation technologies, moreover various types of commercial agreements, for example, energy swaps, create opportunity to make energy more transportable and fungible. On the other hand, almost omnipresent sources of alternative energy — solar, wind, biomass, *etc.* — have added new features to the world's energy map.

In the sixth chapter we stress on hydronomics. As the world economy grows, global warming increases its effects, and because water resources have not been distributed in equal quantity (or quality) among countries, water issues are gradually becoming more important in a geo-economic context. Domestic water resources are depleted to produce goods and services, which are needed for international trade. Thus, goods and services embody expenditures of water in their value, defined by the term “virtual

water,” which means the volume of water that has been used to produce those goods and services.

In the seventh chapter diversification of conventional energy sources, shale gas and oil production, development of alternative energy resources to increase their share in overall energy consumption, increased efficiency and effectiveness in the production and consumption of energy and other innovations are discussed. Thanks are due Fuad Chiragov, alumnus Columbia University and research fellow at the Center for Strategic Studies under the President of Azerbaijan for his contributions in Chapter 7.

In the eighth chapter we offered to create the development function. In fact, the time has come to lay out a new systematic scientific review of the factors in economic growth, because production functions (Cobb-Douglas, the elasticity of substitution, *etc.*) cannot explain current economic development. Because production functions are limited to measuring the impact of labor and capital on manufacture, it has become necessary to develop modified and expanded forms of these functions. For example, the institutional environment, different types of natural resources, knowledge, and so forth, can be added as new production functions to the number of independent variables. In fact, the new variables will transform the production function into a new paradigm: the development function. It is important to note the economic-historical necessity for this.

In the ninth chapter innovation-led development is stressed. This means that along geo-economical reasons, innovation and modernization are important for economic growth.

In the tenth chapter, “The impact of some key factors on labor productivity in European countries,” we analyze the impact of R&D, government spending on education, and trade unions on labor productivity, using data for fifteen EU countries. This chapter justifies the efforts of developing nations to reach European levels in terms of productivity. A panel data econometric model approach is used to evaluate the importance of regressors. Existing economic evidence clearly demonstrates the positive effects of R&D and government spending on education on labor productivity, while a dense concentration of trade unions has a negative impact. We therefore conclude that increased spending on modernization is likely to be an effective strategy for these countries as a way to accelerate economic growth.

In eleventh chapter we conclude the book. Targeted development funds, transport corridors, currency wars, different calibrated unions, etc., are the geo-economic leverage in states’ arsenals as they exert their influence. Geo-economics will be increasing in importance as soft power, in line with the future paradigms of new regionalisms, globalization and neo-liberalism.

Interested researchers, policymakers and students will find much of value in this book’s concrete explanation of a new and interesting field: geo-economics.

2. Geo-Economic Recalibration

With a net worth of \$76 billion, Bill Gates in his office with his digital work style creates more additional value than Mongolia's \$15.2 billion GDP in its vast territory of almost 1.6m sq. km. If Bill Gates was a country, he would be among the richest forty. It is a **geo-economical paradox**: the vastness of the ground under our feet is not as decisive as human capability in a bid to create wealth (or an economy). Mongolia, a natural resource giant, produces \$9,717 worth of GDP per sq. km in its enormous territory, while Singapore has reached the level of \$457m per sq. km, in other words 47 thousand times that of Mongolia! During the Mongolian Empire, the largest (33m sq. km) contiguous continental empire in history, land was "stock in trade" for nomad tribes and peasants to develop an economy. In a predominantly agrarian economy, which implies that agriculture is superior to other economic endeavors, the importance of land as a production factor is reasonable. And all economies in ancient and medieval times were land intensive.

A considerable amount of theoretical and empirical investigation into agricultural economics has been directed towards assessment of the modernization of agriculture. In order to evaluate the impact of education in modernizing the traditional agricultures of Nepal, Pudasaini (1983) utilized a production function framework.

Constantin *et al* (2009) note that producers operating above the production frontier are defined as technically efficient, while those who operate under the production frontier are considered

technically inefficient. In such a case, modernization pushes producers to perform above the production frontier.

Ishikawa (1967) argues that since agricultural inputs are mutually complementary, a Cobb-Douglas production function in agriculture is inadmissible. Sau (1971) believes that if an estimate uses the only two independent variables, which are land and human labor, then we solve inter-collinearity between regressors. On the other hand, Mittelhammer *et al.* (1980) consider that econometricians have made substantial progress in mitigating the effects of multicollinearity, such as ridge regression, principal components regression, exact linear restrictions, Bayesian econometrics, and mixed estimation.

Scott *et al* (1960) run a cross-sectional equation to analyze the issue of factor substitution in agriculture for Western Europe and state that there is a positive correlation between farm size and the price of labor. Having used the Cobb-Douglass production function, Fleisher *et al* (1992) determined the productivity level of Chinese agriculture. Jorgenson *et al* (1987), in order to estimate the production function for agriculture, use two factors of production — capital and labor. However, Echevarria (1998) considers that since both capital and labor grow faster than employed land, increasing their weight results in a smaller calculation of total factor productivity growth rate.

Agrarianism continued its dominance, which derived from

ancient times, extending through the medieval period, to the 18th century, with Jeffersonian democracy and the economic theory of physiocracy, until its meltdown in the waves of industrial revolutions in the 19th century.

The comparison of Mongolia and Singapore reveals the other reality of geo-economics: while in the past, the vastness of territory was privilege, as for the Mongolian Empire, in present times, Singapore's strategic location creates opportunity to receive international (western) support to counterbalance China. Either the vastness of territory or a strategic location that fuels a counterbalance policy are factors of geo-economics. There is no one-size-fits-all geo-economical prescription for every time and place. Thus, depending on circumstances, the importance of various geo-economical aspects will change from time to time and place to place.

McCord et al. (2013) noted:

Growth took off in England and in other places where the mix of physical, technological, and institutional conditions made it possible. Our argument is that the underlying conditions were as much biophysical and geophysical as they were institutional. Economies benefited to the extent that nature lent a strong hand. Some of the advantages included holdings of fossil fuels, proximity to ports, high quality agricultural land, and low malaria burden. Of course institutions also mattered for the functioning of the economy. Our view is

that geography is a conditioning variable, neither a sole determinant of development, nor a deterministic factor.

Lynn et al. (2006) found a correlation of 0.6 between IQ and per capita income. Despite strong criticism, they describe national differences in intelligence that range between an average of 67 in sub-Saharan Africa to 105 in “Asian tiger” economies of the Pacific Rim. If one nation, the Chinese, shows two different average IQs in Hong Kong and China, then the differences are not related to race. It is a conclusion open to debate, that the above-mentioned correlation is more geo-economics and explained by how prone the society is to develop.

The Fertile Crescent, a semi-circular area covering the comparatively moist and fertile lands of Western Asia and the Nile Valley and the Nile Delta of northeast Africa, was the cradle of civilization. Civilization progressed due to the favorable nature of climate and geography, which initiated the shift from hunting and gathering to a more developed level: food production. And further, since nomadic peoples tamed the horse, they were able to mobilize armies to conquer vast territories.

Diamond (1999) argues that agriculture was able to appear in the Fertile Crescent due to the domestication of locally available wild plants, without having to wait for the arrival of crops derived from wild plants and domesticated elsewhere. Below, Diamond (1999) explains in more detail:

A final advantage of early food production in the Fertile Crescent is that it may have faced less competition from the hunter-gatherer life style than that in some other areas, including the western Mediterranean. Southwest Asia has few large rivers and only a short coastline, providing relatively meager aquatic resources (in the form of river and coastal fish and shell-fish). One of the important mammal species hunted for meat, the gazelle, originally lived in huge herds but was overexploited by the growing human population and reduced to low numbers. Thus, the food production package quickly became superior to the hunter-gatherer package. Sedentary villages based on cereals were already in existence before the rise of food production and predisposed those hunter-gathers to agriculture and herding. In the Fertile Crescent the transition from hunting-gathering to food production took place relatively fast: as late as 9000 B.C. people still had no crops and domestic animals and were entirely dependent on wild foods, but by 6000 B.C. some societies were almost completely dependent on crops and domestic animals.

A favorable climate and other attributes of nature, as well as fertile lands, were the initial stimulus for the development of civilization, but the Great Silk Road, European excursions into Asia by land as prelude to the Age of Discovery, and the Age of Discovery itself increased the importance of trade as a driver of economy and redrew the geo-economic map of the world. Venice,

Genoa, Amalfi and other Mediterranean city-states flourished by holding a monopoly in maritime trade, until Vasco de Gama discovered a sea route in the late 15th century to India, bypassing the Great Silk Road that was blocked by the Ottoman Empire. At that time, the monopoly of trade shifted from Mediterranean city-states to Amsterdam, Antwerp, and others. If Portugal pioneered the eastern dimension of the Age of Discovery, its neighboring Iberian rival, Spain, opened a New World: the American continent. Portuguese dominance of the West African sea routes spurred Spain into sending Christopher Columbus's expedition to attempt to reach India via an itinerary other than one under Portuguese control.

Map 2.1. The Age of Discovery



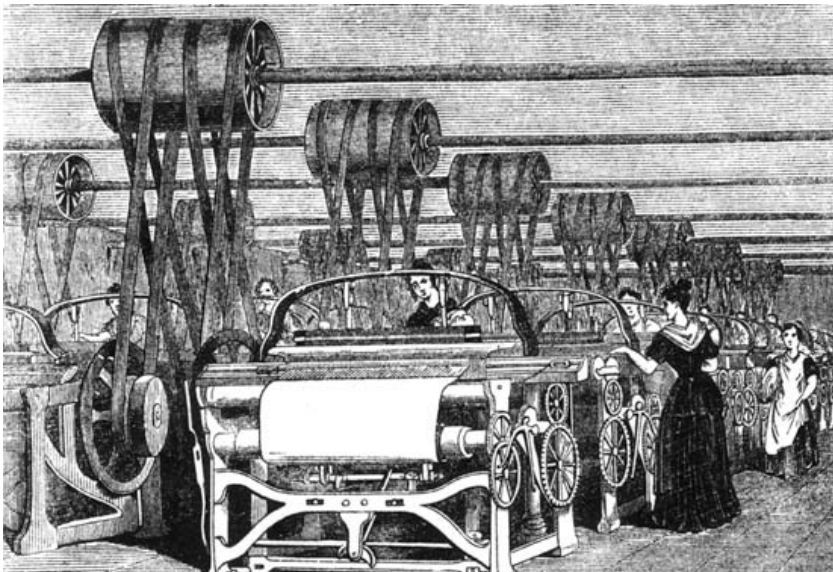
Fukuyama (2014) considers that Europe's ability to dominate other parts of the world has to do with a number of geographical factors

like the east-west lines of communication that link the Eurasian continent compared to the north-south axes of North and South America across different climatic zones, which pose big obstacles to movement. Fukuyama (2014) argues that this geo-economical aspect explains the diffusion of technologies across similar climatic zones, while differences in climate prevented a similar diffusion in the western hemisphere. Kissinger (2014) states that the age of three centuries of preponderant European influence in world affairs had been launched after the Age of Discovery. To this end, a new paradigm called “Geo-Economic Lift” should be coined. Newly discovered sea routes were geo-economic lifts for Spain and Portugal to become world powers. In other words, geo-economic reshuffling determines the future perspectives of global, regional and national economic developments. (For example, at present, oil and gas transport projects such as the *Trans-Anatolian Natural Gas Pipeline (TANAP)*, the *Trans-Adriatic Pipeline (TAP)*, the *Baku-Tbilisi-Ceyhan oil pipeline* and others are geo-economic lifts for Azerbaijan, a rising power between Russia and Iran.)

Since the industrial revolutions of the 18th century there has been shrinking demand for ground, making technology and human skills more important for economic growth. In the 18th century and beyond, core regions shifted from a combination of agricultural and industrial interests to purely industrial concerns. Wallerstein (1974) showed that in 1700, England was Europe’s leading industrial producer as well as the leader in agricultural production. By 1900,

only 10% of England's population was engaged in agriculture. Given the influence of these industrial revolutions, the nature of geo-economics has been changing.

Picture 2.1. Industrial revolution: *The invention of power looms at the time of the Industrial Revolution dramatically increased the productivity of the textile industry.*



Source: www.britannica.com

The famous Azerbaijani economist Ahmad Mahmudov has stated that, as a result of investment, the natural fertility of the soil is constantly being restored, resulting in increases in productivity. Prof. Mahmudov explains the systemic factors involved in economic intensification: the application of advanced technologies, specialization and optimization. The most important inventions to

boost industrialization, like the steam engine, electricity, digitization, etc., have made the production process more mobile, flexible and less space-consuming. Blinder (2006), for example, says:

...in modern economies, nature's whimsy is far less important than it was in the past. Today, much comparative advantage derives from human effort rather than natural conditions. The concentration of computer companies around Silicon Valley, for example, has nothing to do with bountiful natural deposits of silicon; it has to do with Xerox's fabled Palo Alto Research Center, the proximity of Stanford University, and the arrival of two young men named Hewlett and Packard. Silicon Valley could have sprouted up elsewhere. One important aspect of this modern reality is that patterns of man-made comparative advantage can and do change over time.

Kissinger (2014) considers that there were two balances of power created in Europe after the Treaty of Westphalia. The overall balance, for which England acted as guardian, ensured and protected general stability. A Central European balance, essentially manipulated by France, aimed to prevent the emergence of a unified Germany, which would then be in a position to become the most powerful country on the Continent. In the early 19th century, Napoleon I achieved domination in continental Europe and decided to punish Britain using geo-economic leverage, the *Blocus continental*. He issued two decrees (the Berlin Decree in 1806 and the Milan Decree in 1807) to force Britain to minimize its trade with the rest of Europe and create difficulties in shipping. In its turn, this continental

blockade brought challenges to the Napoleonic Empire. Applying Newton's third law to economics, if the Napoleonic Empire exerted a force on a Britain, then the latter exerted an equal and opposite force on the former. For example, because of the blockade against Britain, European nations were deprived of their purchases of British colonial goods, which led to new unrest, even turmoil, against Napoleon as a prelude to Russia's rejection of the implementation of the Continental System.

Map 2.2. The Blocus continental. *The Continental System was an early form of trade blockade, controlled by a group of French allied or Client States.*



Source: <https://historyguys.wordpress.com/2011/08/06/the-island-blockade/>

Napoleon's attempt to redraw the geo-economical map of Europe failed after the Moscow Campaign. The invasion of Russia failed primarily because geographical factors, such as cold weather and the vastness of the Russian territories, were decisive in allowing Czar Alexander I to retreat, gather strength and push Napoleon's army out of Russia in 1812. Similarly, geopolitical and geo-economical factors have been crucial for the extension of Russian territories from the 16th to the 20th centuries.

The Russian borders along the Arctic and Pacific Oceans posed no danger during the period that shaped Russian statehood, and, in fact, were a key element in the creation and expansion of the Russian state. The wide expanse of Siberia's borders with the Arctic Ocean and its hostile weather from the North and along the Pacific Ocean from the East provided a safe haven inland, where troops could retreat and find shelter in case of emergency. At the same time, it was historically easier for Russia to expand its territory by conquest towards Siberia, rather than in other directions. That is why the distance from Moscow to Kaliningrad is 1092 km, while from Moscow to Sakhalin is 6663 km.

Speaking in Valdai in 2014, Putin brought up issues with regard to protecting Russian interests and recalled the expression, "What is allowed to Jupiter is not allowed to the bull," saying that, "We cannot agree with such formulations. Maybe it is not allowed to the bull, but I want to tell you, the bear does not ask anybody's permission. In general, the bear is depicted as master of the taiga,

and I know for sure he is not going to move to some other climatic zones, there he feels uncomfortable, and he will not cede his taiga¹.”

It is not accidental that the bear has been a symbol of Russia since as early as the 16th century, the starting point of Russian expansion. Today because of territorial disputes, nuclear weapons, new technologies and climate change, the Pacific and Arctic borders of Russia are not as safe as they were centuries ago. For example, the Arctic may exhibit a strong response to global change and may initiate dramatic climatic changes through alterations induced in the oceanic thermohaline circulation (THC) by its cold, southward-moving currents or through its effects on the global albedo resulting from changes in its total ice cover.

After the defeat of Napoleon I, the Vienna system (Concert of Europe) became the balance of power and security system in Europe orchestrated by Russia, Britain, France, Prussia and Austria via the Quadruple Alliance and the Holy Alliance. According to Bairoch (1976), in 1830 Russia had the largest GNP (PPP) at \$10,555 million US (1960 dollars), followed by France (\$8,582 million US (1960 dollars) and Britain (\$8,245 million US (1960 dollars)). Thus, the importance of each major player's role in Europe's security system was correlated with their economic power. It was not accidental that Russian Czar Alexander I was the most powerful ruler after the collapse of

1 <http://ru-facts.com/news/view/40365.html>

the French Empire, because of the large magnitude of Russian GNP, along with his triumph over Napoleon I. Although defeated, France quickly rejoined international diplomacy; becoming a member of the Quadruple Alliance was possible because of its traditional role in international affairs, including its economic power, together with Charles Maurice de Talleyrand-Périgord's diplomatic competence at the Congress of Vienna in 1814-1815. Unlike France at the Vienna Congress, after World War I, a defeated Germany was not allowed to take part in the European order, in line with the 1919 Treaty of Versailles. Because Germany both before and after World War I had the most population and the largest GDP in Europe, it created fear in the Allied victors. In spite of policies of deterrence, Germany's GDP in 1937 was \$328 billion US (1990 dollars), more than that of France and Italy put together.

Ferguson (2014) asks why Americans should care about the history of the British Empire? His answer is, first, that the United States was a product of that empire, and, second, the British Empire is the most commonly cited precedent for the global power currently wielded by the U.S. Similar to the collapse of the British Empire, the decline of American power across the world is causing a new regionalism, mainly the awakening of the Asian Powerhouse, driven primarily by China Plus (China and the Southeast Asian countries where the Chinese Diaspora is influential).

On the other hand, as globalization speeds up, the transferability of goods and services is becoming cheaper and easier, the fence between tradable and non-tradable items is gradually vanishing. With more items available for trade, the theory of geo-economics is evolving in a bid to be adjusted to the new realities.

Now we are in transition to the knowledge economy, and therefore geo-economics takes on a new meaning under globalization. Rosecrance (1999) argues that we are entering the Age of the Virtual State, when land and its products are no longer the primary source of power, when managing flows is more important than maintaining stockpiles, when service industries are the greatest source of wealth and expertise, and creativity is the greatest natural resource. He gives Hong Kong, Singapore and Taiwan as examples of the Virtual State.

Rosecrance (1999) continues by stating that because producing countries don't nationalize their foreign plants as they did in 1960s and 1970s, foreign direct investment is now more secure abroad and creates a new paradigm: **production abroad**. Interdependent states have grown far more rapidly than autarchic economies. Having used the data from 1971-2000 for 23 developed countries, Naveed and Shabbir (2006) found that trade openness is significant and positively affects the growth of GDP per capita. Rosecrance (1999) argues that, unlike 19th century behemoths — the United States, Germany and Russia — which aimed at omnicompetence, the virtual state doesn't seek to excel in all economic functions,

from mining and agriculture to production and distribution. The virtual state derives its income not only from the middle part of the value chain, like manufacturing, but also, and primarily, from the starting and finishing ends of the value chain: product design, marketing, financing, sales, etc. It is not accidental that the smiling curve concept, which implies that the both ends of the value chain in the IT sector command higher values added to the product than the middle part of the value chain, making a curve like a smile, was introduced by business tycoon Stan Shih from a virtual state — Taiwan.

In sum, our argument is that geo-economic policy and the nature of the economic system are mutually interdependent, in other words, their interrelationship determines the direction of economic development. Impulse-response causality shows that sometimes economic systems have caused the great shifts in geo-economic policy, while sometimes the latter defined the former. For example, in Europe, the search for gold initiated to a certain extent the geo-economic efforts resulting in the Age of Discovery. On the other hand, after the Age of Discovery, agrarianism became submerged under the dominance of trade and industry.

Geo-economics to some extent is affected by the apartness of countries too. Countries situated in fertile lands and at transportation crossroads used this opportunity until the Age of Discovery revealed an additional advantage associated with the geographical remoteness of states. States such as the U.S.,

Australia, Argentina (in the 19th century) and Canada used their opportunity to break away from the Old World, Eurasia, and reached a high level of economic, social, geopolitical and military achievement. We call the geography in which these states are situated **the Gilded Crescent**, which surrounds Eurasia and Africa.

Map 2.3. The Gilded Crescent



There are many explanations for how faraway countries developed so fast. We consider the impact of economic institutions, extractive and inclusive, on development. Acemoglu and Robinson (2013) explain economic success by way of different institutions, the rules influencing how the economy

works, and incentives that motivate people. Let us distinguish only geo-economical reasons, putting aside issues such as institutional developments. As these countries stayed away from destructive world wars, they managed to save both economy and infrastructure. Thus, accumulation of capital stock in these faraway countries made them rich, unlike those countries that suffered from devastating events in the Old World.

Moreover, untapped natural resources in these widely dispersed countries created prospects for boosting the resource-driven economies that were preludes to an efficiency-seeking system. For example, in the U.S., iron ore mines opened in the Lake Superior region, coal was discovered in the Appalachian Mountains, oil was found in western Pennsylvania, copper and silver mines were discovered in the 19th century. The finding of natural resources laid the foundation for the U.S. to outperform Great Britain in terms of manufacturing output during the Gilded Age in the second part of the 19th century. Wallerstein (1974) indicates that the inclusion of Africa and the Asian continents as peripheral zones increased the available surplus, allowing other areas, such as the U.S. and Germany, to enhance their core status.

Furthermore, large territories were crucial to advance the economies of these countries. It is not accidental that all states of **the Gilded Crescent** are among the top ten largest countries in the world. In addition, the U.S., Canada, Argentina and

Australia obtained economic advantage due to size of their territories, which were also far from foreign occupations.

To this end, the comparison of the sea power and land power paradigms originated by Mahan and Mackinder, respectively, are worth discussing. Mahan argues for the supremacy of the seas, based on features such as geography, population and government. Mahan's approach was crucial for shaping the U.S., Japanese and French naval doctrines.

In his revolutionary book, *The Influence of Sea Power upon History: 1660–1783*, Mahan writes:

The first and most obvious light in which the sea presents itself from the political and social point of view is that of great highway; or better, perhaps, of a wide common, over which men may pass in all directions, but on which some well-worn paths show that controlling reasons have led them to choose certain lines of travel rather than others. These lines of travel are called trade routes; and the reasons which have determined them are to be sought in the history of the world. Notwithstanding all the familiar and unfamiliar dangers of the sea, both travel and traffic by water have always been easier and cheaper by land. The commercial greatness of Holland was due not only to her shipping at sea, but also to the numerous tranquil water-ways which gave such cheap and easy access to her own interior and to that of Germany.

In contrast to Mahan, Mackinder in his Heartland Theory prefers land power to sea power. Mackinder differentiates the World-Island (Europe, Asia, and Africa), the offshore islands (including the islands of Britain and Japan) and the outlying islands (North America, South America, and Australia).

Neither approach, Mahan nor Mackinder, has been triumphant. Historically there is justification for a dualistic concept. For example, the Treaty of Portsmouth in 1905 officially recognized the victory of Japan, a greater sea power than Russia, while land power was more important during World War I.

In *Tectonic Shift* Sheth and Sisodia (2006) argue that the industrialized world is reshaping itself into three large zones: The European Union, expanded to include East European countries and Russia; North America; and Asia. But dramatic changes in world geo-economics and geopolitics after publication of *Tectonic Shift* have opened a new landscape different from Sheth and Sisodia's (2006) forecast. Rising Russian influence has changed the balance of powers and resulted in the creation of a new power center: the Eurasian Union. Thus Russia is becoming the leader of a new economic zone, rather than the eastern continuation of the EU. In their turn, the EU and the U.S. intend to strengthen transatlantic cooperation. The Trade and Investment Partnership (TTIP) is a proposed free trade agreement between the European Union and the United States.

Japan, South Korea, Singapore, Hong Kong and Australia along with the Transatlantic Bloc that includes the U.S. and the EU are demonstrating competitive advantage in the field of technological products. Kissinger (2014) considers that if the U.S. were to be separated from Europe in terms of politics, economics, and defense, it would become geopolitically an island off the shores of Eurasia, and Europe itself could turn into an appendage to the reach of Asia and the Middle East.

Legrenzy *et. al.* (2013) note that the Middle Eastern states that have amassed a significant wealth surplus because of high energy prices have been investing in domestic infrastructure and are attempting to become a financial hub, at least at the regional level. But their most profitable export products remain oil and gas. The kingpin of OPEC, Saudi Arabia, has upgraded its refining infrastructure and is now the biggest exporter of petrochemical products.

On the other hand, the U.S. competes with China in the Pacific region, relying on its fulcrums in Asia. Chinese leadership has found New Confucianism a useful tool for foreign policy to shield itself and expand influence in peaceful way. For the present, as Sean Silbert, a journalist from the *Los Angeles Times*, emphasized, Chinese President Xi Jinping speaks in a “bold, down-to-earth manner.”

Sheth and Sisodia’s (2006) argument with regard to radical

geo-economic restructuring, changes in trade flows, has been justifying itself: although, historically, trade between nations has flowed on East-West lines (Europe - North America - Japan), now as great powers seek their developing-world partners, the flow will be predominantly North-South.

Robert D. Kaplan, one of the world's "Top 100 Global Thinkers," analyzes the perspectives of regional hegemonies: the United States in North America, Brazil in South America, Germany in Europe, Russia in Eurasia, China in Asia, and so on. The problem with this scenario is that it implies equality among hegemonies where none exists. It also assumes that these hegemonies are themselves stable, which they often are not. Thus Kaplan has significant doubts about the realization of regional hegemony and explains his idea in the following way: Brazil has profound institutional problems and social unrest. Russia will not dominate energy markets as much in the future, even as its own population declines. On the other hand, the effectiveness of Russian innovation lift has not yet been proven. The former finance minister of Russia, Alexei Kudrin, stated that because of the Ukraine crisis, "We will be balancing on the edge of recession all the time." Germany is too entrapped in the Russian economy and energy sector to maintain a forceful foreign policy. China sits atop a vast credit bubble, which is only one of its structural and economic challenges. The United States has its problems, to be sure: partisan gridlock, a broken health care sector, increasing disparity between the poor and wealthy,

and so forth. But the problems that burden the other hegemonies are, in a number of cases, worse and far more fundamental. Kaplan considers that anarchic formlessness combined with postmodern technology may help define the world that ultimately awaits us.

The World Economic Forum compiled three scenarios for the future of the world: Split-up, Southern Gateway and Climate Pressure. According to the first scenario, “Split-up,” by 2035 the global economy will be dominated by powerful trading blocs centered on the Atlantic, Indian and Pacific oceans. “Southern Gateway” means that the global economy of 2035 will be digital, knowledge-based and dominated by newly advancing economies. According to the scenario entitled “Climate Pressure,” by 2035, the burgeoning effects of climate change will be starting to cause havoc in the global economy. The consequences of these disruptions include a rising demand for environmentally responsible growth. For example, EU leaders have agreed to the binding greenhouse gas reduction target of at least 40 percent by 2030 compared to 1990 levels, the most ambitious proposal in the world. The policy framework also sets an indicative target to achieve 27 percent in energy savings and a binding target to source at least 27 percent of EU energy consumption from renewable sources over the same period.

In the collection of tales entitled “One Thousand and One Nights,” Scheherazade, knowing that she might be killed by the Sultan Shahrayar, uses the idea of a cliffhanger, while telling him a story

each night. She always halted the story at an interesting point, so that the sultan would be eager to know the rest on the next night. History does something of the same thing, recounting the development of geo-economical recalibration like a cliffhanger. But one important thing is clear: In the runoff the winners will be those who rely on technology and science, and effectively transform their institutions.

3. Geo-Economic Heredity

The South Caucasus, Central Asia and Mongolia are a chain of countries along the central part of Eurasia. This belt extends from Georgia to Mongolia, more than five thousand kilometers. Since this belt of countries has historically bordered large neighbors (Russia, China, Iran, etc.), they have been squeezed from both North and South — like hamburger, and their territories have become flattened, almost as if they had been compressed between nippers. Thus all these countries have elongated territories that extend from the West to the East. Like creatures in the deep ocean, these states must survive under extremely high pressure. We call this paradigm the **“nippers effect.”** Climate zones reinforce the nippers effect. Because climate zones are belt-shaped, nations tend to follow the pattern, with each country drawing out to greater length from the West to the East.

Unlike the countries mentioned above, South American countries have not suffered from the nippers effect. Consequently, their territories extend down from the North to the South. Even the encircling girdle-shaped climate zones haven't been able to impact the successive states in this region. The narrowest countries in the world, long and thin, stretching from north to south, are situated in South America.

To begin with, the indigenous people of this continent were living along the coasts of the Atlantic and Pacific Oceans. It is not accidental that the most important cities of the continent are on the coast or close to it. Coastal cities of South America are far larger than any others inland.

Furthermore, the longest continental mountain range, the Andes

at 7,240 km in length, extends from the southern tip of **South America** all the way to **Panama**. Stretching from south to north as it does, the Andes range affects the placement of population along the strips from the top of the continent to the bottom. Moreover, South America was colonized by Portugal and Spain, but only from the Atlantic coast. Thus, pressing from east to west left a trail. Finally, as there are many nationalities in South America, because the continent was settled by different migratory waves from Asia, Europe and Africa, the creation of nations along climate zones was not effective, nor was it a possible choice. For example, the longest country in the world is Brazil, whose territory extends 4,395 kilometers from north to south covering diverse nationalities. Its location is not accidental given the arguments above.

All inhabited continents gave birth to states shaped like them. Ratios of length to width of the largest countries in Eurasia, South America and Africa are almost equivalent to the ratio of length to width of the continents themselves. Of course, this case fits Australia the best. As this continent is only one state, ratios of length to width of country and continent are 100 percent equal. We call this paradigm **geo-economic heredity**. Countries have been shaped as if their continents had been shaken up to give a similar form to their borders. As country becomes larger, its shape of territory approaches to that of continent. In mathematical notation it is a limit: the value that a shape of territory approaches as the input comes near some value.

Table 3.1. Geo-Economic Heredity: Ratio of Length to Width of Continents and their Countries

Territory	Ratio of length/width
Eurasia	0.733
Russia	0.444
China	0.762
India	1.071
Kazakhstan	0.615
Saudi Arabia	1
Indonesia	0.389
Iran	1.052
Mongolia	0.648
Pakistan	1.333
Turkey	0.475
Average of ten largest countries	0.7789

Territory	Ratio of length/width
Africa	1.057
Algeria	1.182
DRC	0.953
Sudan	1.115
Libya	1.081
Chad	1.5
Niger	0.794
Angola	1.037
Mali	0.952
South Africa	0.946
Ethiopia	0.734
Average of ten largest countries	1.0294

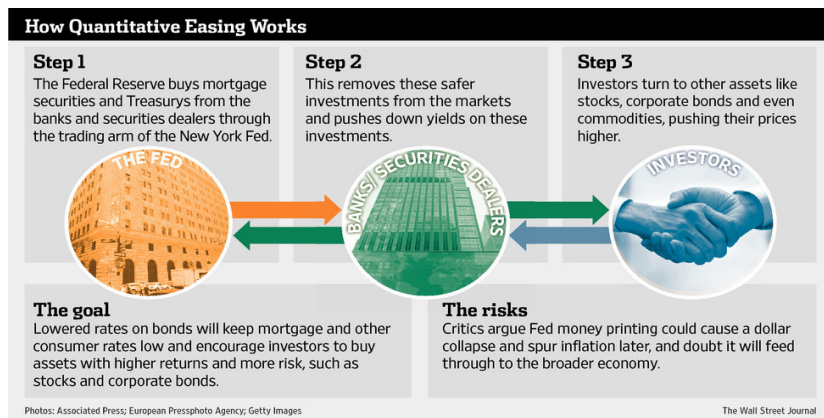
Territory	Ratio of length/width
S.America	1.5
Brazil	1.017
Argentina	2.941
Columbia	1.25
Peru	1.4
Venezuela	0.735
Chile	10
Paraguay	1.048
Uruguay	1.071
Ecuador	1.085
Bolivia	1.055
Average of ten largest countries (without Chile)	1.29

4. Unicurrency

Yellen (2014) has stated that when considering the connections between financial stability, price stability, and full employment, the discussion often focuses on the potential for conflicts among these objectives. Still more complexity is raised by this issue when coordination of monetary and fiscal policies across the world is the subject for discussion. Ideally, economic growth together with financial and price stability should be the goal at national, regional and global levels. Although after the financial crisis of 2008, there were some arrangements to coordinate monetary and fiscal policy around the world, the interventionist strategy and devaluation policy of some of the big players, in addition to geopolitical and geo-economical fighting, have led to worldwide deregulation. The IMF has been less than effective in its coordination of bailout programs that spread from China to the U.S. Regionalism and nationalism have outweighed globalism, and this has impeded central banks and governments from maintaining a consensus in their fight against the most destructive worldwide economic crisis ever. Mueller (2012) emphasized that by practicing a “zero interest rate policy” (ZIRP), by buying assets of dubious quality from financial institutions through its Troubled Assets Relief Program (TARP) and by trying to pump ever more liquidity into the market through its policy of “quantitative easing” (QE), an expansion of unprecedented proportions of the Federal Reserve’s balance sheet has occurred. The real or imagined assumption that the financial

system is on the verge of complete collapse has brought about massive government bailouts and stimulus programs that have resulted in rising fiscal deficits and unsustainable public-debt burdens. Of course, stimulation policies have ensured economic growth after the crisis, but there is a growing sense that only the wealthiest are reaping the benefits. For example, UNCTAD indicates that transnational companies are holding record levels of cash, which so far have not translated into sustained growth in investment, although the current cash “overhang” may fuel a future surge in FDI.

Figure 4.1. Quantitative Easing



Without strong commitment to the coordination of mid-term and long-term fiscal and monetary goals among states around the world and, where relevant, to delegate partial authority to independent intergovernmental councils, sustainable improvements in fiscal

and monetary performance will remain elusive. Existing fiscal and monetary performance around the world excludes the impact of fiscal and monetary policies beyond national borders. The point is that each government's fiscal and monetary policy has direct, indirect, and induced effects across borders. From that perspective, positive fiscal and monetary policy within national borders could create negative impacts on others beyond borders (like bailout programs to protect domestic markets). The extent of the impact deriving from fiscal and monetary policy is correlated with the convertibility of national currency, economic scale, trade openness, military presence, etc. Thus the U.S. dollar is the very fastest transmitting mechanism for delivering messages about U.S. economic policy across the world. (In 2014, foreign exchange reserves of central banks were mainly held in U.S. Treasury bills and amounted to 4.4 trillion U.S. dollars). And the consequences of the macroeconomic policies of the G20 deliver more impact than those of smaller economies. In 2008 the world economy faced its most dangerous crisis, which derived from the mortgage market in the U.S., while hyperinflation in Zimbabwe, which started in the late 1990s, was a storm in a teacup not affecting the rest of the world. When the U.S. sneezes, the rest of world catches cold.

More convertible currency means more chance to swallow another's value. Convertible currency is being used by large economies to regulate their balance of payments. Because receipts

for loans and investments are surplus items for the balance of payments, convertible currency is a mechanism to attract value instead of foreign debt or giving assets to non-residents. So the growth of productivity in a national economy should be more than the average interest rate for foreign debt and investment. Otherwise solvency and an economic slowdown will become challenges. A long-term gap existing between the average interest rate for foreign debt and investment and the productivity level in the economy creates *acquired economic deficiency syndrome*. *Thus, economies ignoring this gap and enjoying the issuing of irresponsible fiat money seem to be purchasing a ticket on the Titanic.*

In order to regulate its balance of payments, the U.S. is more inclined to sell bonds; Russia runs down its strategic currency reserves; and Turkey prefers to attract foreign investments. The U.S. and Turkey, with deficits in their current accounts, have been increasing both debt and foreign ownership of their assets. In spite of a current account surplus of \$11.4 billion in the third quarter of 2014 and a floating exchange rate, the Russian Central Bank's reserves have been melting under the ruble's devaluation, deriving from international sanctions and lower oil prices which began in mid-2014.

A higher convertible currency means a stronger positive impact of a stimulus package on the economy, because stimulus policies need financial sources, as well as foreign funds. For example,

the U.S., with the strongest convertible currency, had economic growth of 6.2 percent between 2009 and 2013, while Japan, with its less convertible yen, increased its GDP only 1.4 percent from 2009 to 2013. By the way, in a bid to finance its stimulus package, the U.S. partially relied on attracting foreign funds, while Japan's debt was mainly held by different branches of the Japanese government. For example, the Bank of Japan alone holds about 20% of outstanding Japanese government bonds.

The stimulus in the U.S. has amounted to more than \$0.8 trillion since 2009, while the nominal GDP growth is approximately twice as large an amount. One-third of the stimulus package was tax cuts, while two-thirds were expenditures in the field of employment, education and health care in the U.S. The amount of today's stimulus package will be financed by future taxes. It is not time to worry about tradeoffs between taxes now or taxes later for the U.S. As long as the U.S. economy and currency merit confidence, there is no concern about the U.S. being able to pay its debt when push comes to shove. Thus, the stimulus package and economic recovery are grounded on confidence. Countries deprived of this kind of faith are not able to stimulate their economy through borrowing; for them fiscal space (flexibility) is valuable. According to Romer (2014), China, Korea, and Australia, which are sound fiscally, undertook relatively large fiscal expansions even though they were not hit exceptionally hard by the downturn and still had considerable room to spare on monetary policy.

Cheap oil is an additional stimulus for bailout programs because it lowers expenditures and drops inflation in net-oil-importing countries such as China, Brazil, India, etc. Japan has been affected from two sides. On one hand, as the world's third largest net oil importer, Japan benefits from cheap oil. On the other hand, Japan's inflation rate is already as low as it can drop. Thus lower oil prices cause difficulties for the policy of Japan's Prime Minister Shinzo Abe in fighting against chronic price drops. Deflation expectations might push price levels down to a point where a downward spiral is galvanized. The European Central Bank has been facing the same problem as Japan: lower price levels that are causing stagnation. A new stimulus package means a higher monetization of the economy.

Henderson (2013) and Conerly (2013) argue that the large holding of U.S. currency abroad has a trivial effect on U.S. GDP. Conerly (2013) has estimated that the annual gain to the U.S. government from people holding dollars in paper currency is probably no more than \$30 billion, a large number, but less than 0.2 percent of U.S. GDP. In his turn, Krugman (2013) noted:

What is true is that the large holdings of U.S. currency outside the United States — largely in the form of \$100 bills, held for obvious reasons — represent, in effect, a roughly \$500 billion zero-interest loan to America. That's nice, but even in normal times it's only worth around \$20 billion a year, or roughly 0.15 percent of GDP. And anyway, the euro has done

well on that front too. If you like, South American drug lords hold dollars, Russian beeznessmen hold euros, and in both cases it's a trivial subsidy to rich, huge economies.

Krugman (2013), Henderson (2013) and Conerly (2013) have referred only to the technical side of the large holdings of U.S. currency outside the United States, drawing fire away from the matter at issue. The point is that a currency with powerful convertibility and major stock exchanges are among the top advantages in attracting foreign debt in a profitable way. Economies with the most convertible currencies and that also have major stock exchanges, such as the U.S., the EU, the UK and Japan, saw their ratios of government debt to GDP reach an all-time high in 2014 after the crisis.

Because convertibility is one of the competitive advantages of a country, it allows it to attract foreign values. For example, big economies with the less convertible currencies, like India and Brazil, decreased the ratio of government debt to GDP from 75.44% in 2008 to 67.2% in 2014 and 58% in 2008 to 56.8% in 2014, respectively. The second largest economy with a less-than-optimum currency for convertibility, China, recorded a government debt to GDP ratio of 22.4% in 2014, in other words, about five times smaller than that of the EU. After 2008's global recession, the ratio of government debt to GDP in China averaged 23.6%, reaching an all-time high of 33.5% in 2010 and dropping to 22.4% in 2014. The rising power of the Chinese yuan and the

Shanghai and Shenzhen stock exchanges are breeding grounds for Beijing to attract funds from abroad.

Quantitative easing, in other words extending the money supply, has been leverage for a majority of the leading economies since the start of the Great Recession in 2008. As a result, the growth of M2 money supply was 65% of the U.S. GDP, 64% of the EU GDP, 192% of China's GDP and 169% of Japan's GDP in 2013.

In spite of the fact that Rosneft's proven oil and gas reserves in terms of billion oil-equivalent barrels exceeds that of Exxon Mobil, the latter's market capitalization surpasses the monthly domestic market capitalization of the Moscow Exchange. The stock markets play a key role in the growing inequality of wealth, because the value of a public oil company is usually gauged by a technique based on market comparisons that are subject for diversion. Measures that refer to price-earnings ratio, book value of assets, discounted cash flow, valuation multiples, etc., are not applicable, as detailed financial information is not usually disclosed. Thus the ratio of market capitalization to proven oil and gas reserves differs from company to company. Companies domiciled in countries with strong stock markets and convertible currencies have a higher ratio of market capitalization to proven oil and gas reserves.

Stiglitz (2010) mentioned that as the economic crisis spread quickly from the U.S. to the rest of the world, the need for a

coordinated global response and plan for recovery became clear, yet each country thought primarily about its own well-being.

A currency war is an effort by one country to stimulate its economy by devaluing its national currency in comparison to that of its trading partners. According to Rickards (2011), a currency war revives ghosts of the Great Depression, when nations engaged in beggar-thy-neighbor devaluations and imposed tariffs that resulted in a collapse of world trade. The specter of a currency war was revived at the end of 2014, with the sharp devaluation of the Russian ruble, because of attempts by Western countries to penalize Russia, in line with their policy to harm Russia's economy because of the Ukrainian crisis.

A currency war might also be illustrated by the case of aircraft production in different countries. There are a certain number of countries engaged in the manufacturing of aircraft, such as the U.S. (Boeing), France (Airbus), and Brazil (Embraer). On the other hand, there are other countries that need aircraft, but don't have an indigenous aircraft industry. Using Kazakhstan as an example, if Kazakhstan needs an airplane, it goes shopping around the world. In case of, let's say, a deliberate cheapening of the US dollar, Boeing will be able to sell aircraft less expensively relative to the other competing aircraft manufacturers.

The dominance of the U.S. dollar as the world's major currency facilitates low interest rates in the U.S., which is effective for

the biggest global economy. As defaults and credit downgrades reduced the price of securities in rival economies during the global economic downturn, the majority of countries preferred to hold their reserves in U.S. assets. Efforts to dethrone the U.S. dollar raises the question: How long will the U.S. dollar play first fiddle?

It appears to be sundown for a currency renaissance for the U.S. dollar. Russia, China, Iran and several other rivals of Washington are trying to triumph over the U.S. dollar as the world's dominant currency, following the EU's action to create single currency with the euro, the second fiddle.

To this end, opponents of the petrodollar have very strong leverage with deals on hydrocarbon resources. For example, Russia intends to realize its new gas deal with China using the ruble and yuan, a deal that is expected to be worth more than \$400 billion. Russia and Iran have joint plans to exchange the U.S. dollar for their national currencies for all bilateral economic transactions. As the *Moscow Times* reported, Russia has long been a proponent of reducing the dollar's pre-eminence in international trade, a position that became top priority this year after Western sanctions over the crisis in Ukraine cut off Russian state banks and major energy firms from U.S. and EU capital markets.

The neologism "Chimerica" describes a vicious circle — a sequence of reciprocal cause and effect in which China sends

cheap goods and services to the U.S. and buys American T-bonds. So this downward spiral creates difficulties for China to unambiguously reject the dominance of the U.S. dollar.

The euro, yuan, ruble, and yen all have their backs to the wall as they try to increase their sphere of influence.

The benefits of a common currency are a lower and more stable inflation rate, lower interest rates and increased trade. In the case of the euro, these benefits are not being applied to all economies regardless of their scale. The cost of the common currency is not just the loss of independent monetary policy and lesser ability to respond to external shocks. So the key question is how different is the size and correlation of shocks across different economies in the same common currency area? In the case of the euro, the answer was very different. For example, Greece and Germany, with different sizes of economies, exports, imports, industrial structures, specializations, wages and union structures produced very different results. It would not be unexpected for Germany to be booming at a time when Greece is in recession. So any given shock is going to impact them differently. How much control over the common monetary policy do countries have? In the case of countries on the euro periphery, little control, while Germany dominates monetary policy. In part, it was by design; Germany had the best monetary policy to begin with. On the other hand, the European Central Bank was intended from the outset to respond less to shocks in the peripheral countries.

One more obstacle is labor mobility within the euro zone. Despite all efforts, labor mobility in the EU still remains relatively low. It is hard because of the languages and cultures to move from one country to another country. It is much easier in the U.S., for example, to move from Texas to California or vice versa. So when California goes into recession, workers move out of California into another state.

Moreover fiscal equalization is the issue for the common currency called the euro. Using an unbalanced mix of fifteen euro-area countries over the period 1979-2010, results of the IMF Working Paper show that: (i) the effectiveness of risk-sharing mechanisms in the euro area is significantly lower than in existing federations (such as the U.S. and Germany) and (ii) it falls sharply in severe downturns just when it is needed most; (iii) a supranational fiscal stabilization mechanism, financed by a relatively small contribution, would be able to fully insure euro area countries against very severe, persistent and unanticipated downturns.

For instance, when Texas goes into recession because of the lower price of oil, the U.S. will spend a lot more on unemployment insurance in Texas. It is much more controversial in the European Union for Germans to spend money on unemployment insurance for Greeks. People in the U.S. feel themselves Americans first, while in the EU individuals think of themselves as, for instance, Greeks first and Europeans second.

Thus the EU has not been an optimum common currency area. That is why there is the idea that, as there was not a common currency area before, it was a mistake to adopt the euro.

A single world currency has been suggested time after time. Bitcoin, Litecoin, Dogecoin, Peercoin, Potcoin and other types of digital currencies are not owned or controlled by any governments or central banks. Thus, volatility and risk (and people's averseness to risk) are the main disadvantages of these currencies, which make it difficult for any to be accepted as a single means of exchange worldwide. A single world currency should accomplish all the functions of money around the world: a medium of exchange, a unit of account and repository of value. Creating swap lines with the providers of convertible currencies cannot meet demand due to near-infinite needs.

The creation of a single world currency could be the main first step for improving the international financial architecture, namely the framework and measures in place to avoid crises and better manage them when they do occur. The global economy requires a single world currency, in order to circumvent issues of volatility. Leading experts believe that unstable currencies are the main reason for the majority of financial crises that have occurred since the establishment of the Bretton Woods system of monetary management in 1944. But under Bretton Woods, as long as currencies were pegged against the dollar, there were no such crises.

In spite of problems, monetary unions like the Eastern Caribbean, Europe, and West and Central African enthusiastically to some extent support the creation of a single world currency. However, a single world currency doesn't at this stage preclude the existence of national currencies. Thus an agreement among the main international powers, as well as the G20, could provide the basis for the development of a new currency.

A single world currency, or “unicurrency,” should be based on a basket of currencies in order to minimize the risk of fluctuations. In line with its purpose, a basket of currencies for a single world currency has to be composed and weighted in accordance with the structure of the G20 economies. We would recommend calculating the shares of G20 countries in line with their domestic market size index delivered by the Global Competitiveness Report. Domestic market size determines the level of participation by each country in the global economy. Thus the level of participation provides a sound basis for estimating the percentages of the currencies of the G20 countries, whereby more important currencies have a larger impact on the single world currency rate.

The burgeoning partnership between the G20 and the IMF promotes the idea of setting up a new global currency, which was reflected in the Los Cabos G20 Summit Action Plan regarding monetary exchange rates and fiscal, financial, and structural development policies.

The IMF could be the “Central Bank” responsible for the regulation of the single world currency, if its management were first made fairer. The necessary reforms in this direction should cover the following areas: reduce the gap between under-represented and over-represented members, and change the criterion for the IMF head from regional origin to specific skill-sets and qualifications. Improving the quota and voice system would allow the IMF to balance the needs of all economic powers, from developing to developed nations. In this way the “Central Bank” of the world could represent the interests of a tiny country as well as those of a superpower.

The Global Currency Center should gradually be taken on by the UN as part of its scope of work. Once the IMF has undergone the necessary reforms (at least voting reforms), which in turn will strengthen its capabilities, it should deal primarily with global fiscal issues. (By the way, delaying of reforms of IMF and World Bank inspires centrifugal forces to create alternative power centers. In contrast, reforms of IMF and World Bank would support centripetal forces to coordinate all efforts over the world.)

In its turn, the Global Currency Center should regulate the single world currency, given that it is directly related to global monetary policy. The concentration of fiscal and monetary policy at the global level is not wise; this division of power is recommended.

The single world currency will lead to a positive correlation between economic quantity and the overall state of the economy. Its pro-cyclical nature can help combat problems caused by countercyclical tendencies. The single world currency will solve the dollar overhang, where the quantity of U.S. dollars overseas exceeds U.S. reserves of gold. In this way, the rest of the world might be able to stop financing the U.S.'s twin deficit.

Furthermore, the existence of the single world currency would reduce transaction costs. In addition, having decreased the speed of devaluation, a new world currency could also decelerate inflation.

“Unicurrency” could also address balance of payments problems around the world.

With the introduction of a single world currency, there would be fewer fluctuations in the global financial markets. “Unicurrency” could serve as a quiet harbor for investors; it would be more difficult to inflate the bubbles. The single world currency could become a regulator of market impulses.

Stiglitz (2010) is in favor of a new global reserve system, as well. If a new global reserve system, and, more broadly, new frameworks for governing the global economic system, can be created, that would be one of the few silver linings to this otherwise dismal cloud. Protectionist macroeconomic policies targeted only at national interests create a surplus of liquidity, which is swallowed

by special groups, inflates bubbles, leads to irrational allocation of resources, causes imbalances and lowers productivity, while, on the contrary, coordinated efforts by all states around the world should lead to economic recovery based on soaring productivity.

5. Geo-Economic Redrawing of the Energy Map

It is difficult to agree with Calder (2012), who describes natural resources, especially physical energy deposits, as immobile, in contrast to services or light manufactures. Globalization and new transportation technologies, and, moreover, various types of commercial agreements, for example, energy swaps, create opportunities to make energy more transportable and fungible. On the other hand, almost omnipresent sources of alternative energy — solar, wind, biomass, etc.— have added new features to the world's energy map. The incremental density of the transportation network has increased the availability of energy everywhere. In addition to the places where conventional energy sources are found, routes for the flow of energy resources have geo-economical importance. The distribution of energy sources is not equal and does not reflect the unbalanced and irregular demand for energy over the world. For instance, on one hand, emerging Asia feels an energy deficit, while continents like America, Australia and Africa are self-sufficient from the perspective of the provision of energy. Energy sources, transportation routes and the utilization of energy are the main components of the global energy value chain. The mutual interrelations, the interconnectedness and interdependence, of stakeholders over the global energy value chain are a subject to be analyzed by geo-economics.

World Trade Organization International Trade Statistics 2013 indicates that the EU imports of fuels and mining products amounted to \$1,034 billion US in 2012, approximately the same

value as the previous year, while China increased imports of fuels and mining products by 3.4 per cent to \$533 billion US, overtaking the United States as the second-largest importer. The U.S. imports of fuel tumbled 7.1 percent due to a sharp increase in domestic production of crude oil. WTO statistics showed that among the top importers of fuels, India increased its imports by the most (+18 percent) in 2012, followed by China (+14 percent). China's imports of non-fuel mining products fell by 8 percent in 2012, and the European Union's imports dropped by 17 percent. As a result, the value of China's imports of mining products (\$221 billion US) is very close to the European Union's (\$228 billion US). In 2011, the difference was much greater (\$241 billion US vs. \$274 billion US). So the two Asian giants, China and India, are beginning to consume more and more fuels and mining products: the pendulum is swinging towards Asia. Having taken the spotlight in world business, both public and private, China especially has succeeded in redrawing the directions of energy flows in the world's geo-economic landscape. As China maintains its high level of economic growth, its domestic production is far from satisfactory, and since coal is a high-polluting source of energy, China is trying to expand its imports of natural gas.

Bob Dudley, Group Chief Executive of BP, expects global energy demand to grow by 36% between 2011 and 2030, driven by the emerging economies. Without continuous improvements in energy efficiency, demand would have to grow much more rapidly

simply to sustain economic growth. In addition, BP's *Energy Outlook* shows that supply patterns are shifting. The *Outlook* demonstrates how unconventional oil and gas are playing a major role in meeting global demand: "Over the period to 2030, the U.S. will become nearly self-sufficient in energy, while China and India will become increasingly import-dependent."

The point is that the lion's share of hydrocarbon resources is situated in the center of Eurasian geography: the Middle East and the Caspian basin. There was a time that the European market was luring the majority of energy flows; however, China has overtaken its main geo-economic rivals. Convergence between economic growth rates of developed and developing nations and China's superior growth rate has affected the direction of the energy map of the world, as well as that of Eurasia. China together with the Southeast Asian tigers are game-changers in the world energy market. On the other hand, flattening energy consumption, rising energy efficiency, the absence of a strong centralized power and possible reliance on future shale gas imported from North America makes Europe less of a competitor with China for energy sources. Thus, Asia under the leadership of China is gradually becoming more lucrative for infrastructure like pipelines for transporting hydrocarbons and supplying LNG and CNG. Of course, it should be mentioned that the EU, taking into account its shrinking domestic gas production and moderate demand growth, is trying to reduce dependence on Russia.

After the collapse of the Soviet Union, Azerbaijan pioneered in opening the Caspian basin for western transnational oil companies with the aim of reaching the European energy market. Following Azerbaijan, Kazakhstan joined this initiative, directing its hydrocarbon resources from the Caspian region through Russia towards Europe, again in partnership with western oil companies. Thus the first geo-economic choice of Caspian hydrocarbon resource-rich countries was the European energy market. Mega transportation projects like the Baku-Tbilisi-Ceyhan oil pipeline and the Caspian Pipeline Consortium were the first signs of the European dimension of energy policy in the post-Soviet Caspian states.

On April 17, 1999, the Baku-Supsa oil pipeline and the Supsa export terminal on the coast of the Black Sea in Georgia were put into operation. Oil extracted from the “Chirag” field was the first oil originating in the Caspian transported to the world market through infrastructure not inherited from the Soviet time, but completely built through the initiative of independent Azerbaijan. The starting point for all infrastructure oriented towards Europe on the west part of the Caspian Sea was an agreement (later called the “Contract of the Century”) signed with eleven large companies from eight countries on September 20, 1994, for the joint development and shared production in the “Azeri”, “Chirag” and “Guneshli” (deepwater) fields in the Azerbaijan sector of the Caspian Sea. Azerbaijan’s initiative in

this area is related to its pioneering role in the Caspian basin.

China's efforts to profit from oil reserves in the Caspian Sea has also brought about profound changes in the area. As the attractiveness of China as a market has increased, hydrocarbons from the eastern part of the Caspian Sea have become a Chinese well. The Kazakhstan – China oil pipeline is China's first direct oil import pipeline from Central Asia. It runs from Kazakhstan's Caspian shore to Xinjiang in China. *Foreign Affairs* indicated that, in 2013, China signed \$30 billion worth of gas and oil deals and became the top investor in Kazakhstan's Kashagan oil field — the largest in the world outside the Middle East. This trend has continued, as, on Dec. 14, 2014, China and Kazakhstan inked \$14 billion worth of infrastructure and energy deals, an important move for Kazakh economic independence, given that 80 percent of its oil exports are currently dependent on Russian-controlled pipelines and railways.

Thus Azerbaijan was the driver of the European dimension, while Kazakhstan opened Caspian hydrocarbon resources for China. In this way two newly independent countries, Azerbaijan and Kazakhstan, have drawn the energy export map for the region of the South Caucasus and Central Asia. Kazakhstan, due to its geographical dependence on Russia, has adjusted its energy export policy in line with Moscow's pre-emptive efforts to minimize gas supply to Europe. From that perspective, Azerbaijan has consistently been able to adhere to its western-oriented oil and gas "diplomacy."

The way paved by Kazakhstan to deliver hydrocarbon resources from Central Asia to China was emulated by Turkmenistan; since 2006, China has been investing seriously in developing gas imports from Turkmenistan, opening its Central Asia Gas Pipeline (CAGP) across Uzbekistan and Kazakhstan at the end of 2009. According to figures from CNPC and *Platts Energy News*, in 2012 Turkmenistan supplied some 27 bcm of gas to China, amounting to over half of its gas imports and nearly one-sixth of its consumption. According to the 2012 agreement, Turkmen natural gas exports to China are programmed to rise to 65 bcm by 2020, equivalent to half of China's total gas consumption in 2011. The world's largest energy consumer's reliance on the world's fourth-largest reserves of natural gas is understandable. Now China is applying a multi-vector principle to the development of natural gas import options from Turkmenistan. China's next plan is to extend transportation capacity through a line yet to be built from Turkmenistan, which will run across Uzbekistan, Kyrgyzstan and Tajikistan before linking up with China. Turkmenistan is trying not to be completely dependent on China. Thus along with Sino-Turkmen cooperation in the field of energy, official Ashgabat has increased its partnership with Japan and South Korea in a bid to counterbalance Chinese influence on it. Such diversified policy contributes to Turkmenistan's efforts to optimize relations with Russia too.

After ten years of difficult talks, China and Russia signed a \$400 billion US gas supply deal in May, 2014, securing the world's

top energy user a major source of cleaner fuel and opening up a new market for Moscow, as it risks losing European customers over the Ukraine crisis (Reuters). The resource base will be the Kovyktino (Ковыктинское) and Chayandino (Чаяндинское) deposits. The slow-motion demise of the old geo-economic order can be observed here: Russia with its huge hydrocarbon resources is taking an eastward direction, keeping the European energy market in check. Construction of the “Powers of Siberia” gas pipeline started in 2014, and the deliveries themselves will have begun in 2018. Taking into consideration the fact that deliveries at the outset will be less than 38 bcm, Russian specialists have calculated that the base cost for gas will be approximately \$380 US for every thousand cubic meters. Further, it will change in accordance with the dynamics of the oil products’ basket (masut, diesel gas oil and Brent oil) based on Singapore prices. More than that, delivery capacities can be increased. Russia and China are negotiating on an additional contract to create a side branch of the “Powers of Siberia” to the sum of several dozen billion dollars.

The existing contract has strategic significance for China. Unrest in the region of Eastern Asia in the middle-term perspective will become an arena of international conflict. To dominate a growing Southeast Asia, China will confront a coalition of Japan and the U.S. The problem of energy security rankles China, as China’s economy is seriously dependent on the import of energy resources. In 2012 China produced only around 40% of the oil it consumed (4.1 bbl of

9.6 bbl a day) and 75% of the gas it consumed (107.2 bcm of 143 bcm yearly). The main exporters of energy resources to China are Middle Eastern countries. However, in conditions of instability in the Persian Gulf those deliveries are fraught with serious transit risks. They must pass along the line of American bases in the Indian Ocean, which are called the “Pearl Necklace,” and then go through the narrow Strait of Malacca, which could be blocked by the American Navy or even by pirates, with the support of certain countries. China tried to reduce the risks of passage through the Malacca strait by constructing a pipeline through the territory of Myanmar, but failed. Washington regularized their relations with authorities of that country and forced them to reject the ambitious transit project. In a new effort, China is studying the possibility of creating a land-base corridor to the Middle East through Pakistani territory. But this route is also full of risks due to extreme instability in Pakistan itself.

The delivery of energy resources to CPR from Central Asian countries could also be under threat. In some Central Asian countries, a time is coming for changes in the top echelons of government elites, which could lead to problems in the domestic situation (especially in Uzbekistan). At the same time, both the U.S. and EU hold strong positions in Central Asian countries, and their aim is to redirect Central Asian gas to the West. Furthermore, domestic elites have never been highly loyal to Beijing. This position is different from Russia, who has proven by her position in a string of international crises over the last few years that she

is faithful to her responsibilities, and that she does not desert her responsible partners.

Finally, deliveries from Middle Eastern countries and Central Asia could fail to meet China's needs in gas. Beijing is aiming to gradually transfer its economy from ecologically harmful coal to "blue fuel." According to some estimates, the Celestial Kingdom will use up to 500 bcm of gas yearly by 2030.

The gas contract with China is profitable for Russia, even if creation of the entire infrastructure, including the pipeline, cost her roughly \$50b US. First of all, Moscow has diversified her gas exports and will not be dependent on the European market with the political difficulties related to the policy of the European Commission. Moreover, it may happen that the amount of Russian gas exported to the East will increase due to prospective new buyers. The Japanese are interested in Russian gas, as they have started to move gradually away from nuclear energy since the Fukushima collapse (in 2012 Tokyo spent \$70b US for gas imports). Japan has had a positive experience cooperating with Russia in the gas arena; every year since 2009 Japan has bought 8.5 million tons of LNG from Sakhalin (10% of all Japanese purchases of this type of fuel). Russia and Japan are discussing a project for the construction of an underwater pipe 1350 km long from the Sakhalin deposits to Hokkaido Island. The delivery rate of the pipeline should be 20 bcm per year, analogous to approximately 15 billion tons of LPG. It is also not out of the question that a gas contract will be concluded with South Korea.

At the same time it is important for Russia not to yield to pressure from China. The Japan-China conflict will increase, taking into account the development of the situation in Eastern Asia and the “Abe Doctrine,” enunciated by the Prime Minister of Japan, which presumes a more active foreign policy. China might ask Russia as “a strategic ally” not to help its “strategic opponent” by modifying its delivery of energy (Sakhalin gas, unlike Middle Eastern gas, can pass through China’s strategic security-sensitive South China sea). Russia is keen not take any side in the conflict and trade with both parties. Thus, Moscow will have the opportunity to maximize her gains, both economically and politically.

Concluding gas contracts with China and in the future with Japan does not mean “Russia is turning East,” which was discussed by some Russian official authorities. Moscow was oriented and is still oriented to Europe – its biggest traditional partner; fifty percent of Russian trade in 2013 was with the EU, with whom Russia has a similar business culture and extensive technological and investment relations. It would be unwise to deny them for the sake of the indefinite prospective cooperation of countries in the Far East, at least for the middle term.

Marin Katusa, Chief Energy Investment Strategist states:

Putin has positioned Russia to play an increasingly dominant role in the global gas scene with two general strategies: first, by building new pipelines to avoid transiting troublesome

countries and to develop Russia's ability to sell gas to Asia, and second, by jumping into the liquefied natural gas (LNG) scene with new facilities in the Far East.

The existing contract has got strategic significance for China. As it grows and surpasses Southeast Asia, China will need to confront the coalition of the Asian "pivot" led by Japan and the U.S.

This is *déjà vu*. Bloomberg affirms that the oil glut in the 1980s led to a six-year decline in prices, contributing to the Soviet Union's failure to keep its shelves stocked with basic consumer goods and undermining its economy. Russia and Iran economically "feel depressed" because of the way they appeared in the aftermath of oil prices falling at the end of 2014. At this time, the interests of the U.S. and its Arab allies, Saudi Arabia and Qatar, coincide. The U.S. is trying to coerce the Kremlin into a solution of the Ukrainian crisis, while its Arab counterparts are interested in depriving the Assad regime of Russian support and to pressure Iran.

A battle is raging over whether pipelines will go toward Europe from east to west, from Iran and Iraq to the Mediterranean coast of Syria, or take a more northbound route from Qatar and Saudi Arabia via Syria and Turkey. Minin (2014) states that, having realized that the Southern Gas Corridor is backed up only by Azerbaijan's reserves and can never equal Russian supplies to Europe or thwart the construction of the South Stream, the West is in a hurry to replace them with resources

from the Persian Gulf. Syria ends up being a key link in this chain, and it inclines toward Iran and Russia; thus it was decided in the Western capitals that its regime needs to change. The fight for “democracy” is a false flag thrown out to cover up totally different aims. Minin (2014) stressed:

It is not difficult to notice that the rebellion in Syria began to grow two years ago, almost at the same time as the signing of a memorandum in the Bush era on June 25, 2011, regarding the construction of a new Iran-Iraq-Syria gas pipeline... It is to stretch 1500 km from Asaluyeh in the largest gas field in the world, North Dome/South Pars (shared between Qatar and Iran) to Damascus. The length of the pipeline on the territory of Iran will be 225 km, in Iraq 500 km, and in Syria 500-700 km. Later it may be extended along the edge of the Mediterranean Sea to Greece. The possibility of supplying liquefied gas to Europe via Syria’s Mediterranean ports is also under consideration. Investments in this project equal 10 billion dollars.

This pipeline, dubbed the “Islamic pipeline,” was supposed to start operation in the period from 2014 to 2016. Its projected capacity is 110 million cubic meters of gas per day (40 billion cubic meters a year). Iraq, Syria and Lebanon have already declared their need for Iranian gas (25-30 million cubic meters per day for Iraq, 20-25 million cubic meters for Syria,

and 5-7 million cubic meters until 2020 for Lebanon). Some of the gas will be supplied via the Arab gas transportation system to Jordan. Experts believe that this project could be an alternative to the Nabucco gas pipeline being promoted by the European Union (with a planned capacity of 30 billion cubic meters of gas per year), which doesn't have sufficient reserves. It was planned to run the Nabucco pipeline from Iraq, Azerbaijan and Turkmenistan through the territory of Turkey. At first Iran was also considered as a resource base, but later it was excluded from the project. After the signing of the memorandum on the Islamic Pipeline, the head of the National Iranian Gas Company (NIGC), Javad Oji, stated that South Pars, with recoverable reserves of 16 trillion cubic meters of gas, is a "reliable source of gas, which is a prerequisite for the building of a pipeline which Nabucco does not have." It is easy to observe that about 20 billion cubic meters per year will remain from this pipeline for Europe, which would be able to compete with Nabucco's 30 billion, but not the 63 billion from the South Stream.

But plummeting oil prices in the end of 2014 have come to mean something different from the period of the 1980s, since the U.S. economy is on the verge of slipping behind that of China, sooner than widely anticipated. China, as a significant importer of oil, benefits from the lower prices of oil initiated by its rival — the biggest economy in the world.

Morse (2014) wrote:

Prices have plummeted for several reasons: some of the decline is attributable to market sentiment, some to market fundamentals and, to a large measure, the geopolitical landscape. Brent crude has averaged around \$110 per barrel since the Libyan disruption took 1m barrels per day off markets. Despite a Saudi production increase in 2011, \$110 Brent was about \$25 a barrel above traded prices just before the Libyan disruption. The main reason why Saudi Arabia could not damp prices was that the disrupted supply was light sweet crude, and refiners who needed it could not replace it with heavier, higher sulphur-content crude.

Meanwhile, two different trends have unfolded since 2011. The first has been the rise of domestic governance problems across oil exporters. Before February 2011, only some 400,000 b/d of oil was off-market because of disruption. Since then, disrupted supply has grown to more than 3.5m b/d at times, counting sanctioned Iranian oil and crude from Nigeria, Sudan, Syria and Yemen, to name a few, leading to geopolitical jitters.

The second trend is the tremendous growth of US oil output. Production is getting less costly every year and break-even costs are plummeting to much lower levels than commonly believed, certainly lower than \$75 per barrel.

On one side are the contiguous countries of China and India, the largest emerging energy consumers, and on the other side are the Middle East and Caspian basin (including Russia), the main energy suppliers of the world, which gives new meaning to the Great Silk Road. We can now call it the Great Energy Road. The ends of this old intercontinental route are entwined together and go further beyond an energy partnership, because the energy-binding interdependence transcends energy and boosts infrastructure and furthers economic cooperation. The emerging East and Southeast Asia demand more energy, while the Middle East and Caspian Basin (including Russia) are keen to receive industrial products and investment inflow from their Asian counterparts. The Middle East and Caspian Basin (including Russia) are as important for Europe as the emerging East and Southeast Asia. Thus the Great Silk Road, from Southeast Asia to Western Europe, as a diagonal line joining two non-consecutive vertices of Eurasian geography, is undergoing a renaissance.

The evidence of the Great Silk Road shows the importance of geography in the development of international political economy. During the Han Dynasty (206 BC – 220 AD) this Road was famous because of the Chinese silk carried along its length, but in the present the same serpentine trail through Eurasia is important to boost energy-binding relations. Overland oil and gas pipelines lead to geo-economical proximity.

Calder argues that Eurasian energy interdependence has proceeded

in two stages. The first, beginning in the 1950s and peaking in relative importance less than a decade ago, was maritime interdependence, with the Middle East and northeast Asia, principally Japan and South Korea, at the antipodes. The second pattern, making its debut after the Cold War and gaining momentum following the 2008 global financial crisis, involved overland interdependence. Both have promoted Eurasian continentalism in different ways.

Redrawing the map of the Chinese economy, the creation of new inland economic centers, is related to geo-economical issues as well. After the Four Modernizations, a policy oriented to strengthen the fields of agriculture, industry, national defense, and science and technology in China, most development in the 1980s and 1990s occurred on the east coast of this country. Calder (2012) argues that over the past decade, new inland growth poles, such as Chengdu, Xian, Chongqing, and even Urumqi and Kashgar in Xinjiang Province have emerged, creating new overland access energy imperatives as well. This growth-inspired development, together with geopolitical aversion to dependence on sea lanes dominated by the U.S. Navy, is motivating the PRC to seek international pipeline access to its overland borders to the west, south, and north, thus intensifying pressures for Eurasian continental interdependence still further. Thus the reshuffling of the energy map is continuing under mixed circumstances that derive from geo-economics and geopolitics.

Having suggested that the EU widen from the Atlantic to the Urals,

David Cameron, the British Prime Minister, triggered a European backlash in response to Russian efforts in Ukraine. On the other hand, the U.S. has been refocusing attention on the dynamic economies of the Pacific Rim to energize this geo-economic area against China.

Map 5.1. The roadmap of U.S. President Barack Obama’s four-nation tour of East Asia: the Asian “pivot” counterbalancing China (April, 2014)



The high concentration of Eurasian energy sources along the “arc of energy deposits” that cover Russia, the Caspian Sea and Persian Gulf divides the continent into two energy-demanding parts. The EU on the west, and south, and southeast Asia on the opposite side, mainly rely on “arc of energy deposits,” the source of more than two-thirds of proven oil and gas reserves in the world. Thus countries, such as Turkey and Ukraine in the west and Afghanistan and Pakistan on the opposite side, are or might become transit hubs for the transport of energy products.

Ukraine, via the major Bratstvo (Brotherhood) and Soyuz (Union) pipelines, ensures about 40 percent of Russia’s flow of natural gas to Europe. The capacity for Russian gas exports via the Ukraine pipeline is 143 bcm/year; via Belarus 35 bcm/year; and through the new pipelines South Stream and Nord Stream 63 bcm/year and 53 bcm/year, respectively. During the Soviet time, all gas exports to Europe were transported across the Ukraine-Slovak border. After the collapse of the Soviet Union, Ukraine kept its advantage as a transit point due to existing pipelines and storage that gave it seasonal flexibility. With its economy sluggish in the first stage after the fall of the Soviet Union, Russia was dependent on gas revenue from its exports via Ukraine to Europe. In its turn, Ukraine was also dependent on Russian gas, as it couldn’t find alternative sources. Full interdependence from the perspective of gas transit remained until Russia repositioned itself as a new power in the 2000s. (In the first decade of sovereignty

a new pipeline across Poland to Germany was constructed, which slightly decreased Russian dependence on Ukrainian transit). Starting at that time, because of political tensions, and especially disputes with Kiev over gas, Russia was forced to find other routes to the EU, such as the South Stream, a planned gas pipeline to transport Russian natural gas through the Black Sea to Bulgaria and further to Greece, Italy and Austria, and Nord Stream, which transports natural gas to Germany, France, the Czech Republic and other countries in Europe. Ukraine remains important as an oil transit route for Russia, as well. The U.S. Energy Information Administration indicates that the 400,000 bbl/d southern leg of the Druzhba oil pipeline transports Russian crude oil through Ukraine to supply most of the oil consumed by Slovakia, Hungary, the Czech Republic, and Bosnia. In 2013, about 300,000 bbl/d of throughput transited the pipeline. Russian crude oil and petroleum products also transit Ukraine by rail for export out of Ukrainian ports.

At the same time Turkey is trying to be the energy aorta for Europe. The Azerbaijan-led Trans Anatolian Natural Gas Pipeline (TANAP) and, as a continuation of this route, the Trans Adriatic Pipeline (TAP), will strengthen the position of Turkey as the core transit nation. TAP is the substitute for the unsuccessful Nabucco-West pipeline project recommended by the European Commission. Azerbaijan, the only reliable source of natural gas, considered Nabucco-West unsuited to its national interests and withdrew its

support. Nor did Azerbaijan want to interfere in the Russian geo-economical sphere of interest in the Western and Central European gas market. (Gazprom's dumping policy — offering natural gas at a price below the price discussed for Nabucco-West pipeline — was the final nail in the coffin). It should be noted, that southern Europe, where Azerbaijan gas will be delivered via TANAP and TAP, is also included in the Russian sphere of interest. But compared to the Western European market, the southern European gas market is less attractive from the perspective of market scale

Box 1. Comparison of TAP and Nabucco-West

TAP offered the consortium a transit tariff of three euros per 100 kilometers of pipeline, 50 cents cheaper than Nabucco-West over the same distance. TAP is also 459 kilometers shorter than Nabucco-West, which reduces total tariffs even further.

The investment amount needed to build the TAP pipeline is also far lower, an estimated 4.4 billion euros compared with 6.6 billion euros for Nabucco-West. As a result of the TAP pick, the consortium of BP, Total, and SOCAR (Azerbaijan State Oil Company) now holds a 50 percent stake in the pipeline (20 percent each for BP and SOCAR and 10 percent for Total).

Energy analyst İlham Şaban also noted that the average purchase prices for gas among TAP's prospective customers (Greece, Albania, Italy, Croatia, Bosnia and Montenegro) are higher than for Nabucco-West's projected clients, who would also have access to Russian gas.

Şahinoglu believes that tangential benefits also explain the TAP pipeline choice. On June 20, SOCAR received approval for its 400 million euro offer for a 66 percent stake in DESFA, the gas distributor for TAP host country Greece. The deal gives SOCAR direct control of a domestic gas distribution market within the EU for the first time.

Source: Eurasianet.org

and purchasing power. It should also be noted that Nabucco-West would have been controlled by European companies, with whom Russia's relations aren't especially good. But the choice of the TAP was practical, as it is led mainly by Azerbaijan and its ally, whose relations with Moscow are based on pragmatism.

It was the “best bad choice” from Moscow's point of view. Having shifted from the Western European gas market to the southern European one, Azerbaijan lessened potential pressure from Russia. In 2013, the international consortium running the Caspian Sea-based Shah Deniz field chose TAP over Nabucco-West to transport Caspian natural gas to Europe based on economic efficiency as well. Eurasianet.org reports that Vice President Al Cook, BP's Azerbaijan executive responsible for the Shah-Deniz project, confirmed this thinking, describing TAP as “seriously more efficient than Nabucco-West from the gas price and tariffs points of view.”

Map 5.2. Transport of natural gas from the Caspian Sea to Europe.



Source: The European Institute

Nevertheless, as mentioned above, Russia was trying to block implementation of the Southern Gas Corridor by using alternative pipelines, such as the Blue Stream and South Stream projects, which aim to supply gas to the same markets as the Southern Gas Corridor. But under pressure from Brussels, Bulgaria, which is dependent on the EU and would have been the entry point for the South Stream to Europe, scrapped the South Stream in 2013. Although Austria, Croatia, Greece, Hungary and Slovenia have bilateral deals with Moscow to construct the South Stream, they have been pressured to reject this project too. So in December, 2014, Russia announced a new alternative gas route under the Black Sea through Turkey to the EU in lieu of the South Stream. Roth (2014) said that if there was one winner it was Turkey, which, along with China and other energy-hungry developing nations, has been exploiting the East-West rift to gain long-term energy supplies at bargain prices. In response to the Russian-Turkish agreement, the E.U., Turkey and Azerbaijan decided to increase the capacity of the TANAP pipeline to 20 bcm.

Although the Nabucco project was initiated by consumers, the Europeans, other supply projects like TANAP and TAP have been initiated by suppliers (Azerbaijan) and transit nations (Turkey) along with multinational companies. The geo-economical pendulum, in swinging from consumers to suppliers, demonstrates more force in the hands of the latter. Rejecting the risks associated with projects proposed for transporting Azerbaijani (as well as Iranian, Iraqi and Turkmen) gas to Europe, the European

Commission adopted a formal decision granting exemptions from EU legislation (the provisions of the 3rd Energy Package on third party access, tariff regulations and unbundling of ownership) for the Trans Adriatic Pipeline (TAP). At present, the Azerbaijan State Oil Company (SOCAR), together with other producer companies (in the Shah Deniz Consortium), such as BP, Statoil and Total, holds 70 percent of the shares of TAP. In the Trans-Anatolian Natural Gas Pipeline (TANAP) SOCAR intends to keep at least a 51 percent controlling interest.

Turkey is trying to include other sources of natural gas to increase its transit capacity. For example, the planned Iran-Turkey-Europe gas pipeline will deliver natural gas from Iran through Turkey to Germany, its final destination. Turkmenistan is also interested in shipping its natural gas via TANAP to Europe. To what extent will Azerbaijan, the main owner of TANAP, be ready to pump Turkmen gas and transport it to the exit point of the pipeline in Europe? Turkmenistan, which holds the fourth largest reserves of natural gas in the world, is trying to diversify its export possibilities. In order to get consent from Baku to join the Southern Gas Corridor, Turkmenistan as a seller and the EU as a buyer need to solve the commercial issues. According to Vagif Aliyev, chief of SOCAR's Investments Department, the use of existing Azerbaijani infrastructure is the subject of talks. Using the concept of geo-economical advantage, Baku will probably not allow Turkmenistan to join the Southern Gas Corridor, unless it minimizes expected risks and maximizes forecast benefits. In

comparison with Turkmenistan, Azerbaijan owns almost seven times fewer proven gas reserves. To this end, Azerbaijan, as a potential transit country, is interested in attracting Turkmenistan to the Southern Gas Corridor under favorable circumstances. The head of SOCAR, Rovnag Abdullayev, has said that Baku “is ready to provide necessary infrastructure, a diversified system of oil and gas pipelines and other opportunities for implementation of projects in the oil and gas sector of Turkmenistan.”

(After the deal over Iranian nuclear program in April, 2015, Iran is getting a new opportunity to join the Southern Gas Corridor. It will depend on the decision of Azerbaijan, Turkey and G6, moreover implementation of the agreement.)

With a decrease forecast for Azerbaijan’s potential gas exports, the nation might be able to benefit from transit capacity. While the pros and cons of this issue are being evaluated in Baku, the European Commission and Ankara are working to invite Turkmenistan to participate in the Southern Gas Corridor. But neither the European Commission nor Turkey can demonstrate a way to convince the Kremlin to construct a short pipeline to transport natural gas from Turkmenistan to Azerbaijan under the Caspian Sea, which Moscow considers its backyard. The EU is seeking energy security, Turkey is attempting to be a gas artery, and Turkmenistan is making efforts to break away from the blockade of dependence on the eastern route. Although Azerbaijan has indicated that its balanced foreign policy implies Europe-oriented integration, Baku also cooperates

actively with Russia, and Azerbaijan is not about to spoil relations with Moscow due to ambiguous perspectives on Turkmenistan's participation in the Southern Gas Corridor. Thus, with the EU as consumer, Turkey as transit nation and Turkmenistan as the source of natural gas it should be possible to create a "geo-economical entente" to deal with Russia and obtain its consent for the construction of the Trans-Caspian gas pipeline to link up with the Southern Gas Corridor. (Russia considers the 300-km long Trans-Caspian gas pipeline an environmentally harmful project, although two functioning 110-km long underwater pipelines interlinking offshore structures of Azerbaijan to coastal facilities in the Caspian Sea have not caused any problem). Azerbaijan might support this entente, especially if the decision is balanced and the deal legally binding. Being a power broker for the Trans-Caspian gas pipeline and influencing other stakeholders to support this project might prove to be very expensive for Azerbaijan, as Baku seems to be kingmaker in game theory, but lacks sufficient resources to determine the destiny of the Trans-Caspian gas pipeline; however, Azerbaijan possesses enough remaining resources to decide which of the viable players will eventually lead the effort.

Turkmenistan has signed an agreement with the Italian Eni SpA to explore for gas in western Turkmenistan. Italian Prime Minister Matteo Renzi made a brief stop in Turkmenistan on his way back from the G20 summit in Australia and said: "The agreement envisages expanding of the production area of Eni

in the west of Turkmenistan until 2032. The two countries have also signed a memorandum of understanding, which opens possibilities for the Italian company to begin a search for oil and gas in the Turkmenistan sector of the Caspian Sea.”¹ Thus the gas potential of western Turkmenistan will be ready for delivery across the Caspian Sea. Eni will be working on blocs 19 and 20 in the Turkmenistan sector of the Caspian Sea, whose resources are estimated at over 500 million tons of oil and over 600 bcm of natural gas. Unlike oil, gas purchases are often based on long term supply agreements. Thus Eni’s activity in western Turkmenistan is an additional stimulus for active negotiations on the implementation of the submarine pipeline crossing the Caspian Sea between Azerbaijan and Turkmenistan.

Map 5.3. The *Trans-Caspian Gas Pipeline* is a submarine interlink between Azerbaijan and Turkmenistan.



¹ Eni to sign memorandum with Turkmenistan to explore two blocs in Caspian Sea, *CaspianBarrel*, November 19, 2014, <http://caspianbarrel.org/?p=22999>

The conflict of interest between suppliers and transit countries is obvious. But in the case of Azerbaijan (the supplier) and Turkey (the transit country), the deal is based on a win-win strategy. With this agreement, Azerbaijan is trying to ensure operational control over transit infrastructure, diversify export routes and lessen the role of transit countries.

In addition to Azeri oil and gas, Turkey is serving as transit route for hydrocarbon resources from Kazakhstan, Russia, and the Middle East. According to the U.S. Energy Information Administration, approximately 3.0 million bbl/d flowed through the Bosphorus and the Dardanelles in 2013 (approximately 2.5 million bbl/d of crude oil and 0.5 million bbl/d of petroleum products). Turkish chokepoints, its straits, are not sufficient to meet the amount of transit planned by the Turkish government. Thus pipelines will play an increasingly important role in the transit of hydrocarbon supplies. The Kirkuk-Ceyhan oil pipeline, Turkey's largest oil pipeline with a capacity of 1.65 million bbl/d, and the Baku-Tbilisi-Ceyhan oil pipeline, Turkey's longest pipeline, with a capacity of 1.2 million bbl/d, are the major transit infrastructure. Because Turkey doesn't have substantial reserves of gas and oil, before becoming an energy transit hub, Turkey had to ensure energy security based on diversified sources. Erdoglu (2014) considers that with Turkey's gas demand skyrocketing and Turkish supply contracts with Russia set to expire, Turkey, on whose land most of the pipelines would lie, will try to take advantage of the

Southern Gas Corridor initiative and use its geographic position to meet its gas demand at low prices and create a short-cut to EU membership.

Pakistan is considered one of core energy transit nations on the way eastward from the “arc of energy deposits.” The *Washington Times* wrote that China has clinched a deal to develop a major deep-sea commercial port in western Pakistan, giving Beijing a potential staging ground to exert influence along some of the world’s busiest shipping lanes that go into and out of the Persian Gulf. The favorable geo-economical placement of Gwadar has transformed it from a small fishing village to an important port at the mouth of the Persian Gulf, the location of the premier source of hydrocarbons in the world. According to the *Washington Times*, the long-discussed project to create a major shipping station in the Pakistani coastal town of Gwadar will open a new front in the simmering rivalry between India and Pakistan, and it is the latest move by Beijing to project its power throughout South Asia through a greatly expanded naval presence.

Gwadar is important for China’s inland territories and landlocked Central Asian nations, as well as Afghanistan. Operated by the state-run Chinese firm, Gwadar will ensure the geo-economical influence of the Celestial Kingdom in the Indian Ocean. The *Express Tribune* indicates that as part of the economic corridor that will turn Pakistan into a hub of regional cooperation, Gwadar Port will be connected through road, rail and fiber links to China

to help enhance trade between the two countries. Over the long term, oil and gas pipelines are also part of an economic corridor. China plans to shorten the 10,000- km Dubai-Shanghai-Urumqi ocean route for importing oil, by creating a Dubai-Gwadar-Urumqi itinerary, thereby reducing the distance to 3,600 km.

Map 5.4. Ports in Gwadar, Hambantota and Sittwe



Source: Crisesboom

Pakistan's other big neighbor, India, needs to increase natural gas imports as part of its primary energy needs, so Delhi is interested in importing gas from the "arc of energy deposits" through Pakistan, one of the pivotal transit nations. The Turkmenistan-

Afghanistan-Pakistan-India (TAPI) natural gas pipeline is planned to bring natural gas from Turkmenistan's Galkynysh field, which has proven gas reserves of 16 tcm, to the Indian border, a distance of over 1,680 km, of which almost half lies in Pakistan.

Map 5.5. TAPI

TAPI NATURAL GAS PIPELINE

FIG. 1



According to the *Oil & Gas Journal*, TAPI has unequivocal U.S. support for a number of reasons, including the interest shown by U.S. oil majors in participating. The U.S. has also offered to finance TAPI to drive Pakistan away from the Iran-Pakistan connection. TAPI will also bypass the Russian pipeline network, thus having no Chinese or Russian involvement, another

stated U.S. goal. The U.S. also believes TAPI will help revive Afghanistan's economy.

The India-Pakistan-Iran (IPI) "Peace Pipeline" could strengthen Pakistan's gas transit capacity too. Although land-based pipelines would likely be more secure and cheaper in comparison to other options for delivering natural gas, India is trying to source undersea options for importing natural gas from the Persian Gulf, bypassing Pakistan.

Some countries from the "arc of energy deposits," – such as Azerbaijan, Kazakhstan, Iran and Russia, are both suppliers of energy and transit countries at the same time. The combination of two leverages, supply and transit, in a single entity strengthens the geo-economic influence of the above-mentioned nations. Russia, with one of the largest proven reserves of oil and gas, and the largest territory in the center of the Eurasian mainland, is very important from the perspective of energy exploration, transit and utilization. At the same time, Iran, the other energy giant on the exit-entry point of the Persian Gulf, enjoys geo-economic advantage. Energy-rich Azerbaijan is the narrow and only passage, linking Europe and Asia overland, between these two historically large neighbors.

In 2014, the *BP Statistical Review of World Energy* released reports that, with 129.9 trillion cubic meters of natural gas, Australia holds 2 percent of the world's proven reserves and leads the region of the Asia Pacific. Considering placement of rapidly

growing economies, such as India, China and Indonesia in the Asia Pacific region, the importance of Australia, a principal exporter of liquefied gas, will be increasing in the future. Although the export of natural gas through pipelines is usual in the majority of cases for intra-continental trade, LNG trade is preferred between continents. At present, Qatar is the world leader in LNG trade, while Australia has plans to outperform Qatar by 2018 to become the number one LNG exporter, thanks to multibillion dollar investment activities. Smith (2014) states that LNG exports are set to surge from about 24 million tons to more than 80 million tons in five years, fueling a fivefold jump in export earnings to more than \$60 billion.

The US Energy Information Administration states:

Australia is rich in commodities, including fossil fuel and uranium reserves. It is one of the few countries belonging to the Organization for Economic Cooperation and Development (OECD) that is a significant net energy exporter, sending nearly 70% of its total energy production (excluding energy imports) overseas, according to data from Australia's Bureau of Resource and Energy Economics (BREE).

Except for crude oil and other liquids, Australia retains a surplus of all other energy commodities. Australia was the world's second-largest coal exporter based on weight in 2012 and the third-largest exporter of liquefied natural gas (LNG) in 2013. Energy exports accounted for 24% of

Australia's total export revenues in 2012, according to BREE. The country holds the world's largest recoverable reserves of uranium (about 32%, based on 2012 data) and is the third-largest producer and exporter of uranium for nuclear-powered electricity, according to the World Nuclear Association. Australia is a net importer of crude oil and refined petroleum products, although the country exports some petroleum liquids.

In its turn, Malaysia, currently the second biggest LNG exporter, has its own plans to increase its LNG infrastructure, as well as commencing new LNG investment in Canada worth about \$36 billion.

In the future, LNG trade will be dominated by those hydrocarbon-rich countries that have direct access to the world's oceans, while landlocked hydrocarbon-rich countries will continue primarily to prefer overland transportation of natural gas.

Unlike North America and Europe, the industrialized Asian giants, China, Japan and South Korea, cannot explore offshore reserves due to territorial disputes. This makes them more vulnerable and sensitive to energy imports, in sharp contrast to, for example, the U.S. Unlike the U.S. and other western nations, the Asian giants don't have enough influential transnational energy companies to obtain access to energy sources and increase their energy security. For example, according to *Forbes*, only Western multinational oil and gas companies — ExxonMobil, Royal Dutch/Shell Group,

BP, Total and Chevron — figure among the world’s top 20 biggest public companies.

Table 5.1. The world’s top ten biggest public oil and gas companies

RANK	NAME	COUNTRY	SALES (\$BIL)	PROFITS (\$BIL)	ASSETS (\$BIL)	MARKET VALUE (\$BIL)
6	ExxonMobil	United States	328.21	36.13	208.34	362.53
7	Royal Dutch/ Shell Group	Netherlands	306.73	25.31	216.95	203.52
8	BP	United Kingdom	249.47	22.63	206.91	225.93
15	Total	France	144.94	14.51	125.47	154.74
16	Chevron	United States	184.92	14.1	124.81	126.8
22	ConocoPhillips	United States	162.41	13.62	107	83.99
31	ENI	Italy	83.09	9.87	91.03	114.42
51	Petrobras- Petróleo Brasil	Brazil	58.43	10.15	76.64	99.82
52	PetroChina	China	46.95	12.43	73.68	172.23
53	Gazprom	Russia	36.47	7.24	104.56	184.37

Source: The Forbes Global 2000. Exshare; FT Interactive Data, LionShares, Reuters Fundamentals, Thomson IBES and Worldscope via FactSet Research Systems; Bloomberg Financial Markets; Forbes.

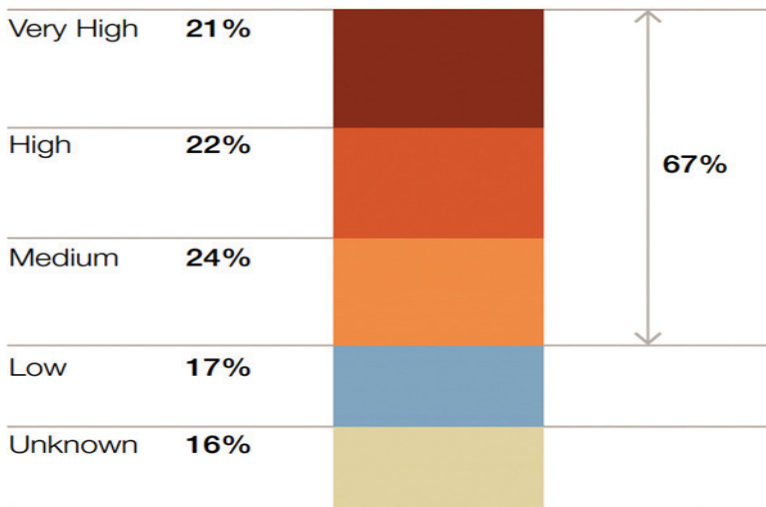
It is difficult for a country with no oil and gas resources to develop a multinational energy company. For example, Japan's Nippon Oil and South Korea's SK Corp. have been ranked 24th and 27th respectively among the world's biggest public oil and gas companies. At present, OPEC and the state-owned oil companies of emerging giants have been increasing their influence. But prior to the oil crisis in 1973, dominance of the oil market belonged to the "Seven Sisters," including BP, Chevron, Royal Dutch Shell and ExxonMobil. The *Financial Times* coined the term "New Seven Sisters" to describe a group of what it argues are the most influential national oil and gas companies based in countries outside of the OECD: Saudi Aramco (Saudi Arabia), China National Petroleum Corporation (China), Gazprom (Russia), National Iranian Oil Company (Iran), Petrobras (Brazil), PDVSA (Venezuela) and Petronas (Malaysia). ExxonMobil's market value is over 2.1 times that of China's National Petroleum Corporation, and 3.6 times that of Petrobras. Thus emerging energy companies have a long way to go to reach the levels of the oldtimers.

Geo-economics affects the *specialization of oil companies*, referring to activities that are native to their part of the world. For instance, fields in the deepwater Atlantic obliged Latin American energy giant Petrobras to be a leader in deepwater development; Exxon Mobil's three major business divisions are headquartered in line with geo-economic logics: the Upstream and Chemical divisions are based in Houston, well-known for its oil and gas industry, while its Downstream division is grounded in suburban

Washington, D.C. Geographical features have allowed Norwegian Statoil to develop the best skills in Arctic offshore coastal drilling. With reference to research done by the OECD, Ferdman (2014) indicates that large multinational companies appear to be much fonder of offering illicit cash for quiet favors than smaller corporate entities. Nearly 60 percent of the foreign bribery cases observed happened in just four sectors: extractive (i.e. mining), construction, transportation and storage, and information and communication.

Figure 5.1. Foreign bribery cases

Two-thirds of bribes were paid to officials in countries higher on the UN Human Development Index



Source: OECD analysis of foreign bribery cases concluded between 15/02/1999 and 01/06/2014

Oil prices, which have been plunging since mid-2014, will leave their traces on multinational hydrocarbon companies. Crooks *et al.* (2014) states that the oil and gas industry has its ear to the ground for a potential gusher of deals. Mergers and acquisitions are expected among oil and gas companies so the struggling ones won't just sink. For example, in the late 1990s and early 2000s, price volatility, added to severe drops in oil prices, obliged a number of major oil companies to merge.

While high oil prices became a cash cow for oil companies, the tumbling prices have been chicken feed for them. Oil companies will not be able to continue incremental investment activities with oil prices plummeting, which could lead to a decline in existing sources of oil. As the world demand for energy is increasing due to the global economic recovery, oil prices will again be moving up in the mid-term. However, lower oil prices could boost the economies of the largest oil-importing countries like China, the EU and India. Thus a higher demand/higher price spiral could occur again in the mid-term, but the probability of a gusher in oil prices, resulting once more in \$140/barrel for the mid-term is very low. OPEC producers believe oil prices could return to about \$70 or \$80 by the end of 2015 as global economic recovery boosts demand. For example, the first positive effects of lower oil prices on economic development were observed in 2014: The U.S. economy grew at 5.0 percent in the third quarter, its quickest pace in eleven years, thanks to lower gasoline prices, among other reasons.

After the reconfiguration in the oil and gas market since the price drop of 2014, newly formed oil companies may find their opportunity lies in being part of the top-level firms.

6. Hydronomics

As the world economy grows, global warming increases its effects, and because water resources have not been distributed in equal quantity (or quality) among countries, water issues are gradually becoming more important in a geo-economic context. Domestic water resources are depleted to produce goods and services, which are needed for international trade. Thus, goods and services embody expenditures of water in their value, defined by the term “virtual water,” which means the volume of water that has been used to produce those goods and services. Water-scarce countries prefer to import water-intensive commodities, and, on the contrary, water-rich countries export these products. Hoekstra (2010) mentioned that subsidized water in Uzbekistan is overused to produce cotton for export; Thailand experiences water problems due to the irrigation of rice for export; Kenya depletes its water resources around Lake Naivasha to produce flowers for export to the UK and the Netherlands; Chinese rivers are heavily polluted through waste flows from factories that produce cheap commodities for the European market. Therefore, the finite resources of water are insufficient to satisfy the growing demands of the global economy. The matter for geo-economics then becomes how much water to use for production, and how the factors of production like water, along with capital and labor, are to be allocated. The FAO addressed the relationship between crop yield and water use in the late seventies, proposing a simple equation where relative reduction in yield is related to the corresponding relative reduction in evapo-transpiration (ET).

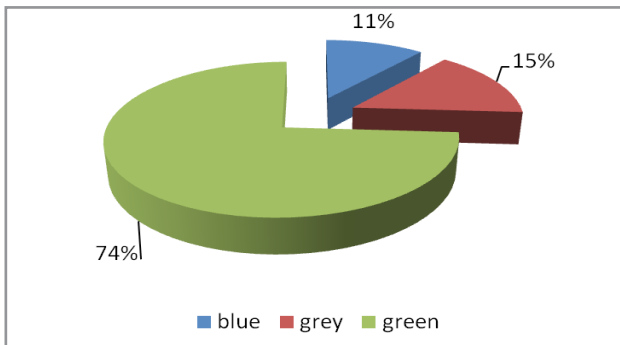
Specifically, the yield response to ET is expressed as:

$$(1 - Y_a/Y_x) = K_y(1 - E T_a/E T_x)$$

where Y_x and Y_a are the maximum and actual yields, ET_x and ET_a are the maximum and actual amounts of evapo-transpiration, and K_y is a yield response factor representing the effect of a reduction in evapo-transpiration on yields. In this equation 1 is a water production function and can be applied to all agricultural crops, i.e., herbaceous trees and vines.

Only 3% of Earth's water is fresh, and most of that remains inaccessible in the ground or frozen in ice caps and glaciers. Humanity depends on the remaining amount for everything from agriculture to industry. Drinking, cooking and washing water use per person varies widely, while the recommended minimum amount of water per person is 20 to 50 liters per day. Citizens in some countries consume much more while others consume much less.

Figure 6.1. The global water footprint in the period 1996-2005

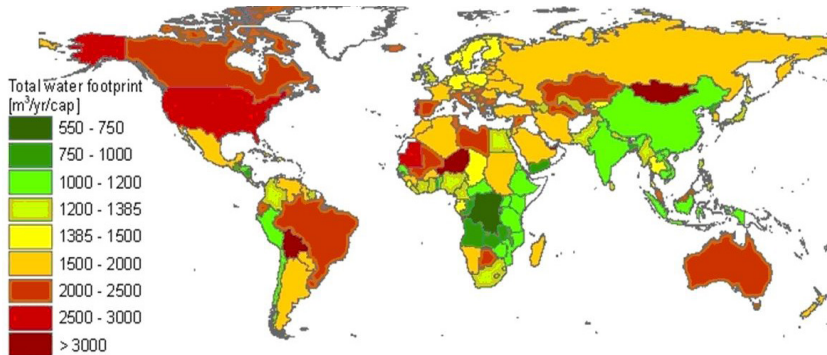


Source: UNESCO-IHE Institute for Water Education

The U.S. leads the world in water consumption, with each person consuming a water footprint of 2842 m³/yr, while the average citizen in China and India have water footprints of 1071 m³/yr and 1089 m³/yr respectively. With the world's population exploding,

water is becoming increasingly important in geopolitical spheres. It is interesting that the majority of hydrocarbon-rich countries, including Iran, Saudi Arabia, Kuwait, the UAE, Qatar, Turkmenistan, Uzbekistan, Azerbaijan, Venezuela, Nigeria, etc., have water shortages. It is as if God has said, “One can’t hold two watermelons in one hand.” People have been granted either oil and gas or water.... Only countries like Russia and the U.S. have been gifted with both blessings, thanks to vast territories covering different landscapes, or Norway with its hydrocarbons offshore in the North and Barents Seas, and water resources in the onshore rivers, lakes and glaciers. Saltwater is desalinated to produce fresh water fit for consumption and irrigation in water-deficient and hydrocarbon-rich countries like the UAE, Saudi Arabia and Azerbaijan.

Map 6.1. Total water footprint over the globe.



Average water footprint of national consumption in m³ per year per capita in the period 1996-2005. Countries shown in green have a water footprint that is smaller than the global average; countries shown in yellow-red have a water footprint larger than the global average. Source: [Mekonnen and Hoekstra \(2011\)](#).

What if the next war isn't over geopolitical dominance or ideology? What if the next war is a desperate struggle over water? Water wars are not new. Ancient Mesopotamian city-states waged a war over water more than 4500 years ago, and water scarcity remains a source of conflict in the modern day. Today, unfortunately, water scarcity is common in some of the world's most politically unstable regions. Water crises are ongoing in Middle Eastern, North African and South Asian countries such as Israel, Egypt, Pakistan and others. With global demand for water surging, countries that suffer from a scarcity of water must decide to improve irrigation systems and increase the efficiency of water use, shouldering the burden themselves or relying on international agencies for assistance.

It is not just a shortage of water, but also an excess of water that can bring disasters. Thus, droughts, floods and rising sea levels are among the top five main threats arising from climate change and listed by the World Bank. For example, Malawi tops the list of countries most at risk for droughts; Bangladesh is most prone to flooding; and all low-lying island states are most vulnerable to rising sea levels. A study conducted by Hallegatte *et. al.* (2013) shows that most of the twenty cities that will face the most serious threats in 2050 from rising sea levels are situated in the Pacific and Atlantic basins. In addition, the authors state, "...some of the cities where flood risk will increase the most in the coming years are not the cities where the risk is particularly high today... Most

coastal cities' current defenses against storm surges and flooding are designed to withstand only current conditions. They aren't prepared for the rising sea levels accompanying climate change that will make future floods more devastating."

Table 6.1. Countries most at risk of the threats arising from climate change

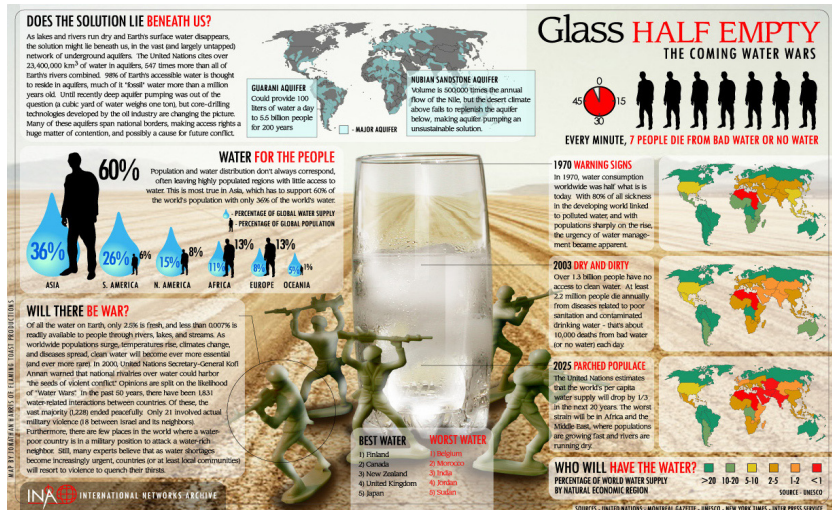
Drought	Flood	Rising sea levels
Malawi	Bangladesh	All low-lying Island states
Ethiopia	China	Vietnam
Zimbabwe	India	Egypt
India	Cambodia	Tunisia
Mozambique	Mozambique	Indonesia
Niger	Laos	Mauritania
Mauritania	Pakistan	China
Eritrea	Sri Lanka	Mexico
Sudan	Thailand	Myanmar
Chad	Vietnam	Bangladesh
Kenya	Benin	Senegal
Iran	Rwanda	Libya

Apart from efficiency in water use, one of the ways water-scarce countries can survive is to have enough foreign exchange to import food, in other words, water-intensive commodities. According to the Water Security Risk Index, released by Maplecroft, a firm specializing in intelligence analyzing corporate risk, Somalia,

Mauritania, Sudan, Niger, Iraq, Uzbekistan, Pakistan, Egypt, Turkmenistan and Syria are the countries with the least secure supplies of water. In addition, the majority of these countries do not appear to have sufficient foreign exchange to import water-intensive commodities at the required level. This could lead to confrontations with neighboring water-rich countries. Maplecroft's research finds that countries in the extreme risk category, including the emerging economies of Pakistan, Egypt and Uzbekistan, are already experiencing internal and cross-border tensions due to limited water resources. Furthermore, as the global climate changes, water stress is predicted to become more acute in these regions and has the potential to threaten stability. The long-running occupation of water-rich Nagorno-Karabakh and the seven surrounding districts of Azerbaijan by Armenia, is expected to be used as pressure against Azerbaijan as well.

The FAO predicts that one in five developing countries will face water shortages by 2030. Global Research indicates that the high water demands of agriculture in both India (where it accounts for 90 percent of water usage) and China (where it accounts for 65 percent) will lead to a drop in wheat and rice yields of between 30 and 50 percent by 2050. In this case, both countries would be forced to import 200-300 million tons of crops. Thus countries with more favorable climatic conditions and an orientation toward export might rely on India and China as growing markets for food products.

Figure 6.2. World water



Source: *International Networks Archive, Princeton University; by Jonathan Harris.*

Moller (2005) indicates that water conflicts may arise on trans-boundary rivers with upstream hydropower use and downstream irrigation use. This occurs because the release of water upstream does not coincide with seasonal irrigation needs of the downstream riparian areas. According to the ODI, over 40 percent of the world's population lives within trans-boundary basins, making the successful management of this resource central to the reduction of poverty, sustainable development and long-term political stability. Moller (2005) gives the example of the conflict on the Syr Darya River, which is shared by the Kyrgyz Republic, Uzbekistan and Kazakhstan. Trans-boundary river conflict between Pakistan and

India has been interwoven into the Kashmir problem.

Both the U.S. and the United Nations believe water conflicts will escalate in the future. In a 2012 report, the U.S. Director of the National Intelligence Office issued some unsettling predictions; the report states that, due to global water issues, a water war will be likely within the next ten years, but it doesn't stop there. Beyond the ten-year mark, the report estimates that the use of water as a weapon to further terrorist objectives will also become more likely.

Some believe this leveraging has already occurred. Nagy (2001) claims that the U.S. intentionally used sanctions against Iraq to degrade the country's water supply after the Gulf War. Furthermore, current technologies such as desalination may mitigate the problem, but they cannot solve it. Some institutions argue that privatization may be the best way for developing countries to acquire the infrastructure necessary to supply clean water. But this approach has mixed results in terms of social unrest when local populations cannot afford the price set by private utility companies, while defenders of privatization argue that this is the best way to create infrastructure.

Locals and indigenous rights groups often accuse corporations of practicing resource extraction by using water for export, industrial use or political leverage. In 2010 this tension reached a breaking point in Bolivia as citizens rioted in protest against privatization.

Who will control the world's water? All states have to work together to ensure water supplies for future generations. In particular, privatization that takes place in developing countries should ensure water security.

7. Oil Prices and Geo-Economic Shifting

7.1.Introduction

Despite widespread political instability in some of the major oil-producing areas of the world — the emergence and rise of ISIS, for example — and even with the latest tensions between Russia and the West on the issue of Ukraine, as well as the negotiations of the G6 countries on the nuclear problem in Iran, as of 2014 we started to observe a decline in oil prices across global markets. Only several years ago, any of this data would have been sufficient to lead to the drastic increase of oil prices. According to the press, the Central Bank of the Russian Federation has even developed a scenario, which although seemingly very unlikely, envisages a so-called “oil shock,” where oil prices could plummet to twenty dollars by 2017.

Although the political issues mentioned above are factors in the decline of oil prices, any one of them could also be a potential reason for a complete change in the world’s energy landscape. Another development that is affecting oil prices, to which we will pay special attention, is the revolution taking place in U.S. energy technologies. Before touching on the Energy Technology Revolution (ETR) and the changing landscape of the U.S. energy sector, it would be worthwhile to examine the other main reasons for oil’s price drop. One of these reasons, together with other issues that will be noted later, increases the assumption that the price of energy resources could diminish even more in the future.

- The decline of oil prices is first of all interconnected

with the lingering problems in the U.S. and world economies. According to Elliott (2014), the slower growth of GDP, contrary to the forecasts, and the assumption that GDP growth will continue to decline in 2015 are a result of expectations that the demand for oil and other energy resources in the world markets will be low.

- One of the main triggers causing the rise of energy prices over the recent years was the increased demand for energy resources by Asia's growing economies (China and India). However, over the past years the growth rate of the economies of these countries has slowed, and a number of problems have emerged. According to critics, not only the growth rate of China's economy has declined, but also institutional problems requiring implementation of fundamental reforms have appeared. It should be noted that the basis for the growth of China's economy over the last twenty to thirty years was the large scale of its exports. This was stimulated by two significant factors that enabled Chinese products to be competitive in the world markets. These were cheap energy prices and cheap labor. With the jump in prices for energy resources in the global markets over this period, the cost of producing Chinese goods became more expensive. We should note that one of the false perceptions about the past is that the U.S. must be unambiguously interested in lowering the price of energy resources in the world market. In fact, the U.S. attitude towards the price of energy resources was based on the following formula: Oil should not be so cheap as to allow China to manufacture its

products even more cheaply; on the other hand oil should not be so expensive that Russia and oil producing countries can dictate their will to the rest of the world.

Another factor is that cheap labor is losing its significance, and wages, in particular in the industrial sector, are on the rise. In other words, the production cost for the manufacture of Chinese goods is increasing. Therefore, one of the indicators in determining the future price of energy resources in the world market will be the dynamics of average salaries in China, because there is a disproportion between them. To put it differently, as the above premise shows, there is now less danger for the U.S. of cheapening Chinese products because of the decline in energy prices.

The consensus between the U.S. and Saudi Arabia on punishing Russia is cited by a number of reputable sources as one of the reasons for the decline in oil prices. Thus, on September 10th, 2014, it was announced that the daily production of oil in August in Saudi Arabia had decreased by 400,000 barrels. On the contrary, Iran and Nigeria notified OPEC that they had increased their production in September, 2014 (an additional 10,000 and 152,000 per day, respectively). In Libya, oil production increased by fivefold over the last three months of 2014 (an additional 800,000 barrels per day). Iran has reduced the price of oil for Asian countries, although it should be noted that even prior to this Iran sold oil to Asian countries at a discounted price to that of the world markets. The U.S. is turning a blind eye to Iran's access

to the world market. After the historic deal on Iran's nuclear program on April 3, 2015, that would lift US sanctions, Iran as one of world's biggest oil exporters could send additional more than 1 million barrels a day to already flooded market. This would be extra pressure on plummeting oil prices.

Picture 7.1. The Malta-flagged Iranian supertanker Delvar. Iran has a backlog of unsold oil ready to hit global markets and is thought to have about 30m barrels held in a fleet of supertankers anchored off its coast (The Guardian).



Photograph: Tim Chong/Reuters

Foreign Affairs, in its May-June 2014 issues, as well as other reputable sources, forecasts that in the near future the U.S. will

produce more than Russia and that it will even overtake Saudi Arabia in terms of oil production in coming years. Over the past years, dozens of articles by well-known experts in reputable U.S. journals and newspapers (*Foreign Affairs*, *Washington Post*, *National Interest*, *Forbes*, etc.) have reported the increase in production of oil and shale gas. They state that this trend in the industry should be supported by the U.S. since it is in its national interest.

The various views of the world's leading voices in the mass media, reputable research organizations and think tanks, as well as those of energy experts regarding the influence of the ETR on the world's energy landscape can be divided into two groups, those with an optimistic and the others with a pessimistic attitude towards this issue. Those who are optimistic about the ETR believe that this technological revolution will radically change the production and consumption of conventional energy in the world and will either eliminate or substantially reduce the dependency of the West on conventional energy resources. Those who are cautious or pessimistic about ETR maintain that it will be technically and practically impossible to eliminate the dependence of the main energy consuming countries on exterior sources for energy, and the views expressed in the U.S. and other western media are nothing but a politically aimed speculation or euphoria about the current state of affairs.

On the opposite side, the press and officials in Russia, an economy

that depends significantly on oil exports, are trying by any means to play down the importance of the ETR in the U.S. and to prove that it is not going to continue, and, most importantly, that the shale gas and oil production will be more costly and very detrimental for the environment. At a meeting of the heads of gas exporting states on July 1, 2013, the president of Russia, where ten percent of GDP is comprised of gas exports, was forced to accept the reality that these new technologies are a threat for gas exporting countries.

In June of 2014, NATO's General Secretary A.F. Rassmussen, in his speech at Chatham House, emphasized the fact that the secret service agencies of Russia had launched a campaign against shale gas and oil production technologies by establishing connections with Europe's environmental groups who were trying to perpetuate the EU's gas dependency on Russia. Then, *Foreign Policy* touched on these issues with its article entitled "The Russian Quiet War against European Fracking."

The article makes references to several NATO sources and states that recently a number of NGOs that had not been environmentally active before have launched a campaign not only against shale gas production, but also against the commissioning of alternative pipelines in separate European countries. These NGOs play a significant role in policy as they denigrate the significance of the development of new technologies and exaggerate their harm to the environment.

Although this work takes no position with regard to endorsing either of the two positions stated above, we think that producers and exporters of energy resources are closely following the dynamics and latest innovations in energy technologies that are unfolding in the U.S. and worldwide. However, given the multi-faceted nature of the ETR, we should concentrate not on the dynamics in the field of shale gas and oil, but on the scholarly research that has been implemented in other areas of energy technologies, together with their practical applications and the direction of their development.

Considering the above issues, we need to clarify the following:

- a) Notwithstanding all the points open to dispute, it is a fact that in recent years the U.S. has become less dependent on foreign energy. And this has significantly affected its entire foreign policy strategy over the last several years. From that perspective, we can refer to the views voiced by the president of Clearview Strategy Group, LLC, Kirk Sherr. He noted that “If previously the Obama administration was interested in the introduction of Iran’s energy resources to the world market while trying to normalize relations with Iran, currently the U.S. is not as interested in this as it used to be, and now it is Iran who is more interested in this.”
- b) If in 2000 shale gas met only 1% of the U.S. demand for gas, the new shale gas technology has put an end to its dependency on foreign gas. The fact is that the biggest

energy importer is no longer the U.S.; beginning in 2012 it has been China. The well-known and reputable consulting company PwC, reporting on shale oil, shows that in the coming years the production of shale oil, following that of shale gas, could cause a revolution with the decline of prices in the world energy markets. According to the company, the availability of these fields in many places in the world allows for the extensive production of shale oil¹. After 2005, when U.S. oil imports reached their peak, imports of foreign oil have consistently declined. While in 2004, 111,000 barrels of shale oil were produced on a daily basis in the U.S., this figure was 553,000 in 2011². Beginning in 2013, the U.S. registered its lowest quantity of oil imports in over 25 years. It is almost certain that this process will continue in the years to come. For example, in May of 2014 the U.S. imported 26% less oil in comparison with May of 2013³. During the annual State of the Union address before Congress in 2014, Obama noted that growing gas production will also cause less harm to the environment as it stimulates the development of the economy. In addition, according to the President, the private sector plans to invest more than \$100 billion for the establishment of new gas producing enterprises in the coming years. Therefore, Obama called on Congress to

1 <http://www.pwc.com/gx/en/oil-gas-energy/publications/shale-oil-changes-energy-markets.jhtml>

2 http://www.pwc.com/en_GX/gx/oil-gas-energy/publications/pdfs/pwc-shale-oil.pdf

3 Why the oil price drop? <http://www.dw.de/%D0%BF%D0%BE%D1%87%D0%B5%D0%BC%D1%83-%D0%BF%D0%B0%D0%B4%D0%B0%D1%8E%D1%82-%D1%86%D0%B5%D0%BD%D1%8B-%D0%BD%D0%B0-%D0%BD%D0%B5%D1%84%D1%82%DC/a-17863389>

establish a favorable legal framework and concessions to further encourage this process.

- c) The issues involved in the ETR, especially with regard to the exploitation of shale fields, can be called for the time being the “American phenomenon.” The U.S. possesses unique features from a geological, geographical, infrastructure and legal perspective for the exploitation of these fields. A unique geographical feature of the U.S. is that, unlike Europe, its pattern of settlement is widely dispersed, or scattered, so the shale fields are located far from areas that are densely populated. Its unique infrastructure includes the existence of a wide network of densely distributed gas pipelines. In many cases, once extracted, shale gas flows via the existing pipelines. The uniqueness of the legal framework is the fact that the lands with shale gas fields are privately owned. Thus, according to U.S. law, any person or entity that owns a plot of land also owns the mineral rights under the land and the air space above the land. This simplifies the necessary legal procedures for the exploitation of these fields. Since these unique features do not exist in a number of other countries, there are obstacles regarding the exploitation of such fields in those countries. It is not plausible to think that these obstacles will be eliminated in the short term. On the other hand, the most important point is that the U.S. so far has had a monopoly on the new technologies and experts

for the exploitation of shale fields. The transfer process of these technologies to other countries will also take some time. At the same time, none of these factors suggest that the exploitation of shale fields will not happen in other countries.

- d) Because of the ETR, the U.S. has moved from energy security to energy independence. Some reviewers assume that in the future the U.S. will transform itself into an oil exporter and will compete with countries exporting energy resources. In June of 2014, an important event covered extensively by the media took place in the U.S. The Department of Commerce issued a license to two companies in Texas, Pioneer Natural Resources and Enterprise Products Partners, for permission to export an ultralight type of crude called condensate. This was one of the most significant events to occur in the U.S. since the ban placed on the export of oil. It is true that this decision by the Department of Commerce did not violate the conditions of the ban on export and only allowed for the limited export of ultralight condensate. Of course, other energy companies, which have been lobbying to lift this ban, are making efforts to acquire these licenses, as well as to eliminate the ban itself. Several discussions already took place in Congress in 2014 with regard to lifting the ban. Until Congress lifts the export ban, the Department of Commerce is restricted to simplifying the issuance of licenses only for the export of “ultralight condensate.” As

a result of the exploitation of shale oil fields, ultralight condensate oil is being produced in a volume that exceeds the processing capacity of oil refineries in the U.S., and this has caused the decline of domestic prices by ten dollars per barrel in comparison with world markets. Currently, the U.S. produces 8 million tons of oil on a daily basis. According to *Forbes* magazine, in 2013 the production of shale oil in the US amounted to 6.5 million tons, an increase of 43% in comparison to 2008. Fifty different companies invested \$186 billion into the exploitation of new fields in the U.S. in 2012. The growth of these investments has reached a record threshold, and in comparison with 2011 increased by 20%. According to estimates by the Brookings Institute, if the current rules on the export of oil moderate, as of 2015 the U.S. will be able to export 700,000 barrels of ultralight oil on a daily basis. It should be noted that there are already “victims of shale oil;” for instance, Nigeria has already stopped its oil exports to the U.S.

- e) The ETR in the U.S. does not just mean innovations unfolding in the shale fields, but it also affects broader areas. Alternative and renewable energy sources are also an integral part of the ETR in the U.S. Though the bulk of the reduction of energy dependence is due to the extraction of shale gas and oil, the current administration attaches great importance to alternative energy sources. In almost every speech Obama

touches on the achievements in this field. For instance, in one of his last speeches, Obama stated that electricity acquired by means of solar energy and wind energy has increased by tenfold and threefold respectively. In the beginning of 2014, during his State of the Union address before the Congress, the President noted that every four minutes a privately owned building is switching to electricity produced from solar panels.

This issue should be highlighted specifically because reducing dependence on foreign energy and the necessity for complete energy independence for the U.S. are perhaps the only indisputable “national idea” agreed on by all political groups on the seriously polarized political stage of the country. Therefore it is not a coincidence that Obama called the support for innovations in this field a priority in both of his presidential campaigns. Other developed countries that are highly dependent on foreign energy, in particular, the European Community, are also being forced to act to reduce their dependency on conventional energy resources. The efforts to reduce this dependence are directed mainly toward the following:

- Diversification of conventional energy sources,
- Shale gas and oil production,
- Development of alternative energy resources to increase their share in overall energy consumption,

- Increased efficiency and effectiveness in the production and consumption of energy,
- Other innovations.

Shale technologies are developing in two main directions:

- Intensive and deep development (further utilization of existing fields). Since the cost incurred for extracting the first unit of oil or gas from shale fields is high, the larger the production using this method, the more cost effective or profitable it becomes. But due to the latest technological innovations, the cost of obtaining one unit of shale gas and oil is declining.
- Extensive or lateral development of shale technologies (new fields). The cost effectiveness of this technology, the application of methods less detrimental to the environment, as well as the necessity to provide for energy independence has encouraged various countries of the world to search for and exploit new fields. This means that in the years to come new shale fields may be discovered in various parts of the world and may be exploited.

In his 2014 State of the Union address before the Congress, while touching on putting an end to foreign energy dependency, the U.S. president noted that their main goal was to achieve this not only by means of shale gas and oil, but with the development of alternative energy resources, as well as by the more efficient use of energy resources and implementation of cost effective technologies.

According to Obama, the current energy policy pursued by the U.S. is one of the ways to return to “lost positions.” Other experts see the ETR as a means for the U.S. economy, which is facing many problems, to find a way out of a difficult situation.

Obama pointed out that this energy policy has not only created new jobs, but has also allowed the U.S. to become the country with the greatest reduction of carbon emissions over the last eight years. To reduce carbon emissions even further, Obama called on Congress to help create⁴ new jobs by replacing foreign manufactured cars with those operated by liquefied natural gas and by increasing the number of filling stations supplying alternative fuels. According to Obama, along with increasing energy production, his administration has tried to increase the effective and efficient use of energy by working in tandem with businesses and local governments over the past several years to reduce energy consumption. For instance, the Obama administration, together with car manufacturers, worked out ways to lessen fuel consumption by consuming more effectively and implemented improved high efficiency standards for new vehicles (standards that ensure less fuel use), while extending a hand to the industry by providing government aid to car manufacturers who had previously experienced a financial crisis. Prior to this they worked on reducing the fuel consumption for heavy vehicles⁵. All these measures will allow the U.S. to produce less oil inside the country.

⁴ According to calculations by IHS Cambridge Energy Research Associates in 2010 the shale gas industry, either directly or indirectly, allowed for creation of 600,000 new jobs for Americans. It is forecast that this figure will double by 2020.

⁵ Such vehicles consume 11-14% of imported oil in the U.S. annually.

7.2. Alternative energy sources and the *Energy Technology Revolution* in the U.S.

Even though shale technology has played a critical role in reducing the dependency of the U.S. on foreign energy, the ETR favors companies that exploit alternative energy sources (solar and wind energy), because these companies are given special treatment and support by the government. If one direction of these efforts is energy efficient technologies, the other direction is the resolution of problems faced by alternative energy technologies. In the U.S., the Department of Defense, with its large scientific research potential, joined this initiative and has involved its different state programs on the use of new and energy efficient technologies. Chief energy consumer among the U.S. federal bodies is the Pentagon.

Interestingly, at first glance, research carried out in this direction in other developed countries sometimes takes an experimental and exotic character. For instance, in 2013 researchers from the Ben-Gurion University of Israel claimed that they had discovered an ecologically clean fuel as an alternative to oil. With a state supported research program the university researchers invented a special method to produce fuel from water and carbon dioxide.

The view of experts with regard to wind and solar energy, which are considered the main alternative energy sources, is that these energy sources, in particular solar energy, are more expensive than the electricity acquired from conventional sources and thus

not profitable. In a number of countries, subsidies funded by the state budget are allocated to produce electricity. In countries like Germany these funds are levied from the population by raising taxes and are a cause of concern. Therefore, the task of scientific research in this field is to ensure that electricity acquired from alternative energy sources is both less costly and profitable. From that perspective, the *Financial Times* sparked interest with an article published on September 18, 2014. The article states that the cost of energy acquired from large wind and solar energy producing enterprises which receive no subsidies can already compete with the price of energy produced at power stations working on natural gas. The article called this news “the fundamental change” in the energy market of the country. The newspaper shows that over the past period the price of energy acquired via solar panels and wind turbines has decreased at the same time as efficiency has increased, and thus it is possible to produce cheaper energy at geographical locations favorable for the production of solar and wind energy as opposed to electricity produced by fossil fuels. This in its turn will advocate for more investments into this field in the future. In the same vein, the *Financial Times* in another article claimed that along with the “shale boom,” a “solar energy revolution” was taking place.

One of the shortcomings of wind and solar energy is that these sources are not reliable due to their inherent natural characteristics, because, given the number of cloudy days and nighttime hours,

sunny days, as well as windy days, are limited in number to locations favorable for the production of this energy. The most important thing is that, unlike other energy sources, this energy should be delivered and consumed right after production. In other words, it is something of a problem to store and deliver this energy to a customer at the time needed. However, Brightsource Energy Inc., situated in Israel and established with the financial support of Google.org, BP Alternative Energy, Morgan Stanley, DBL Investors, Draper Fisher Jurvetson, Chevron Technology Ventures, Statoil Venture, and Black River, has taken a major step in eliminating a part of this shortcoming by developing a heat-storing technology that permits the storage of heat at nights and on cloudy days with the launching of its new solar power station in California.⁶ The new station, the construction of which took more than \$2.2 billion and which will supply 140,000 houses and apartments with power, replaces a medium-sized gas power station and causes no harm to the environment. It is forecast that, by 2020, one-third of the electricity demand of the state of California will be met using alternative and renewable energy sources. Other states are following California's steps. The target set is that by 2030 10% of the overall demand in the U.S. for electricity should be met just by solar energy.

It should also be added that as the exploitation of alternative energy sources increases, the positions of political groups

⁶ Big Solar Comes of Age, November 5, 2013, <https://www.youtube.com/watch?v=A--1eRAcQd0&feature=share> and <http://www.brightsourceenergy.com/>

supporting them are also strengthened. Thus, if the interests of conventional energy resources are defended by conservative groups in the U.S., the position of liberals and leftists lobbying for new alternative energy sources is being strengthened, perhaps enough to push out the conservative groups. For example, coal mining historically had a big share in the U.S. energy system, but is among those groups that have been the most subject to pressure by the new alternative energy industry. Some reviewers call this fight “The Civil War.”

According to the latest report by Environment America Research and Policy Center, over the last decade electricity production from solar power in the U.S. increased from 97 megawatts in 2003 to 120 megawatts in the end of 2013, in other words it increased by more than 20%. The report also shows that 74% of newly-built power stations in the U.S. in the first quarter of 2014 fall to the share of solar energy. According to the latest report by the Federal Energy Regulatory Commission’s Office of Energy Projects, this figure amounted to 88.2% in May of 2014, together with wind, bio-waste and hydropower stations. The most important thing is that the cost for installing these systems has decreased by 60% since 2011.

Like other companies, the reputable IBM and Swiss Airlight have already presented prototypes of products they intend to introduce to the market in 2017 by conducting research on the technology for less expensive production of solar energy. The representatives

of these companies claim that the technology they are developing will offer unique differences and advantages compared to current solar energy production technologies. Using more than 80% of solar rays effectively to produce electricity, their technology can use this energy as the source to heat and cool facilities. The most important thing is that the installation of their technology will be three times cheaper than the existing technologies.

7.3. The *Energy Technology Revolution* in other countries

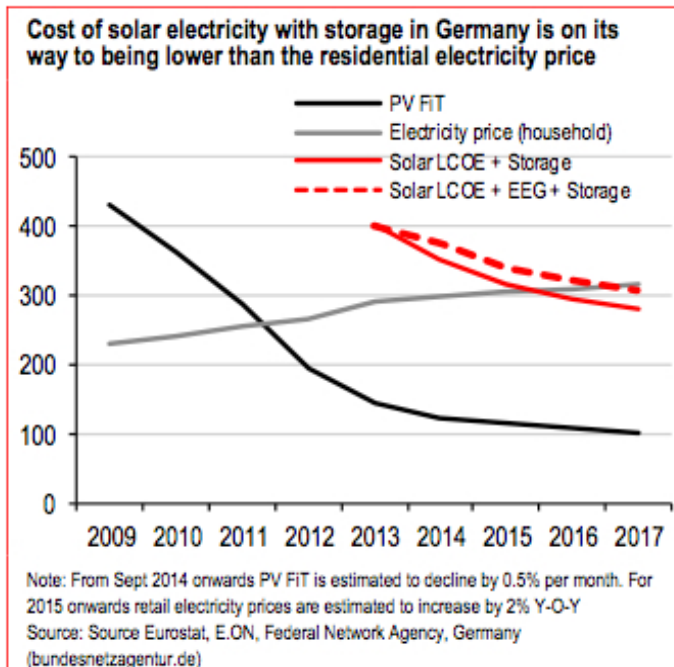
Among developed countries, Germany attaches great importance to the extensive use of alternative energy sources⁷. Soon the Germans will meet 30% of their energy demand this way. By the end of 2014, Germany was meeting more than 27% of its energy demand using clean energy sources. According to its “Energiewende” plan they plan to raise this figure to 60% by 2035. The development of alternative energy sources in Germany was pushed even harder after the disaster at the Fukushima nuclear power station in Japan and Berlin’s refusal to remain dependent on their own nuclear energy

Research is underway in Germany to eliminate natural barriers that currently exist to prevent the development of alternative energy resources. Furthermore, research and the work undertaken in this direction have started to yield positive results. According to studies by the well-known investment bank HSBC, electricity

⁷ Energy Transition, The German Energiewende, <http://energytransition.de/> and http://energytransition.de/wp-content/themes/boell/pdf/en/German-Energy-Transition_en.pdf

obtained from solar energy and other alternative energy sources will replace that obtained from conventional coal mining sources as its production cost becomes gradually less and less expensive. According to the estimates of another investment bank, UBS, by 2020 small-scale solar plus traditional power generation will be so cost effective for individual households that there will be no demand to construct new power stations in Europe to produce electricity from fossil fuels (oil, gas, and coal).

Figure 7.2. Cost of electricity in Germany



Though the price of electricity in Germany, in particular of electricity obtained from alternative energy sources, is currently expensive in comparison with other countries (although production cost and price are becoming lower), 84% of the respondents to a social survey supported the development of energy sources and policy leading to the development of a green economy⁸. Despite the high prices, experts give three reasons for such strong support. First of all, unlike other countries, Germany consumes electricity efficiently and economically. In other words, even though the price of electricity is high, the Germans do not spend more than the consumers of other countries on electricity. The second reason is the strong public view on environment and its significance. The third reason is that newly built enterprises that produce alternative energy are sold by way of small shares to a majority of the public. In other words, the revenues coming from these enterprises are going back to the people in the form of small dividends. Millions of people individually and collectively took part in financing the establishment of these enterprises by engaging different foundations and social security funds for these projects.

Within a span of two weeks in June of 2014, three records were registered in Germany in the production of solar energy. Moreover, on June 9, 50.6% of electric energy consumed for twenty-four hours was produced by solar panels. It should be noted that the Germans are currently working on “Desertec,”

⁸ Survey finds Germans want shift to renewable, <http://www.dw.de/survey-finds-germans-want-shift-to-renewables/a-17167037>

a project that envisages production and transport of electricity produced in sun-rich deserts by means of voltage lines over great distances. For the time being this project is in its conceptual stage and foresees electricity production in sunny places of North Africa, the Middle East and remote areas of southern Europe, with subsequent transport to Europe of electricity produced.

As we noted, studies are underway in other areas of energy technology. The main thrust of these studies is the reduction of energy consumption by applying innovative technologies in energy consumption. For instance, on October 7 (2014) a Japanese scholar received the Nobel Prize for inventing blue light-emitting diodes. According to estimates, 20 percent of electricity consumed in the world is expended on lighting. Called “revolutionary,” estimates are that use of the newly invented diodes will decrease the consumption of electricity by 4 percent. Another innovation in this field, which for the time being seems exotic, is the launch of the construction of the new Tesla factory, which will manufacture cars that run on electricity. It is estimated that 500,000 cars will be manufactured at this facility annually. The only shortcoming of these cars is that their production cost is higher in comparison to that of cars that run on conventional fuel and that their performance lags in terms of speed, range and other physical characteristics. While allocating a stimulus fund from the government for assisting the automobile industry back in 2009, Obama envisaged \$2.4 billion just for studies in this field.

With these funds the Department of Energy's ARPA-E agency established the Argonne National Laboratory and other research centers at private companies.

A number of steps have also been taken in Europe to exploit shale technologies more widely. As we pointed out, one of the main obstacles to extracting gas with this method is the harm this technology causes to the environment. However, the UK's Department of Energy and Climate Change, in a special release to the press, disclosed that the production of shale gas is in line with the targets the UK has set with regard to carbon emissions. A similar position was already taken by Germany and other countries. This means that the main obstacle to the exploitation of shale fields has been overcome. According to the *Financial Times* (June 4, 2014), in 2015 Germany is expected to lift the ban prohibiting the application of shale technology. It also notes that Germany was forced to take this step because Russia has recently used energy as a more aggressive means to exert pressure on the West.

Other large economies and energy importers, such as China, India and others, are continuing their extensive studies and research in this field. In 2012, the UN Energy Department reported that China, the world's largest energy importing country, possesses the largest known shale gas fields. On the eve of Putin's visit to China in March, 2014, to sign a gas contract, the newspaper *Jenmin Jibao*, published by the official press agency of China's

Communist party, reported a “strategic accomplishment” in the development of a shale gas field with two trillion cubic meters of shale gas reserves. It was noted that there is more gas to be exploited in the Fulin field than in the two major gas fields in Russian Siberia.

7.4. Conclusion

In 2009, when Obama assumed the presidency, energy experts forecast that the U.S. would double its imports of condensed gas in the following five years. In other words, according to the forecasts, the dependence of the U.S. on foreign energy should have increased. But the revolution unfolding in U.S. energy technologies proved that these forecasts were completely inaccurate. Of course, this may have been possible due to the exploitation of more shale gas fields as opposed to alternative energy resources. As we stated above, energy independence in the U.S. and other countries dependent on foreign energy resources is an issue of “national security” and a “national idea.” Therefore, it is not accidental that the Rockefellers, who historically made the bulk of their fortune from the oil industry, announced that they would sell shares in the amount of \$50 billion currently invested in the oil industry and direct the proceeds to the development of alternative energy sources.

The Bush administration’s Iraq War, which incurred heavy

financial and human losses and spoiled the image of the administration, as well as the latest tensions with Russia and uncertainties unfolding in the Middle East, have increased the necessity in recent years to be energy independent. This necessity will become even more acute when the balance of power shifts and economies of countries such as China and India grow and take an even more active role in the fight for energy resources. Therefore, the struggle for rich sources of conventional energy will become even stiffer, and the activities to reduce dependency on external energy sources, diversify the energy consumption basket and use alternative energy will take a more dynamic shape. Based on the principles of supply and demand that form the basis of economic theory we can say generally that today there is an increased demand and need to stop the dependency on conventional energy sources, and this same necessity is driving big states to deploy their economic strength to meet this demand. In this situation, where demand or necessity is encouraging large-scale scientific studies, there can be no guarantees that there will not be some scientific invention or proposal that would liberate the world economy from energy dependency or reduce it substantially. On the contrary, it is just a matter of time — or a great historical necessity — for this scientific invention or finding to appear. The award of the Nobel prize to the invention that will reduce consumption of electricity for lighting from 20 percent to 4 percent is an indicator of the special importance attached to this

issue in the West. We can say with confidence that in the years to come we will witness similar inventions and effective proposals. We note that the current situation in the field of energy resembles the situation which reigned in the energy markets in 1970. Therefore, this period is very important from the point of view of historical experience to assist in drawing conclusions. In the beginning of the 1970s the price of oil and energy resources in the world markets increased drastically due to the embargo by OPEC members. Countries such as the USSR and Iran under the leadership of the Shah benefited from the energy prices, and they used many of the funds they gained for political purposes in an effort to transform international relations. Pursuing a more ambitious foreign policy, the USSR increased its aid to the Communist regimes of Eastern Europe. Iran, which was almost a semi-colony of the West, started to express its position under the motto “the regional leader state” or the “new model for development.” Iran increased repressions against internal opposition and started to turn a blind eye to appeals from the liberal circles of the West regarding democracy and human rights issues and thus spoiled its relations with the U.S. It is interesting that a number of researchers claim that the West came out stronger from this situation. This crisis forced more efficient use of energy technologies, computerization, and microelectronics, as well as the use of new materials and new industrial processes. As a result, in 1979, the U.S. twice reduced its oil imports, and in the following years the price of oil in

the world markets started to decline. This in turn shattered the internal political stability in countries such as the USSR and Iran by increasing social and economic problems and contradictions.

We must emphasize that the U.S. and the West still haven't hidden their intention to punish energy-rich Russia, as they have openly discussed different ways of doing this. For example, an article in the *Wall Street Journal* (May 2014) by former CIA director and current co-chair of the U.S. Energy Security Council, *James Woolsey*, is an attention-getter. The article proposes to set a target price reduction of oil to sixty dollars, in order to punish Russia. Although noting that it is a "challenging task," the article proposes reducing the percentage of oil used in transportation below 95%, as was the case when the amount of oil used for the production of electricity was reduced from 17 percent to the current 1 percent.

8. Geo-Economic Shifting

Japan's stagnant economy in the 1980s left the science of economics faced with a difficult question: how effective are market models? Until the 1980s, the international community thought that the "Japanese economic miracle" would conquer the world, and Japan would overtake the United States in their economy marathon. But the "Japanese miracle" engine did not last and researchers found no answers to this question. Instead, they invented a phrase: the "Japanese-style stagnation trap." In 2008, during the global economic crisis, most developed economies, including the U.S. and EU, were caught in the "Japanese trap." Thus, economists who previously worked with vague outlines for economic development came to a general conclusion about the necessity for a new conceptual approach. The new development concept is a knowledge-based system, one that preserves environmental balance and the unity of social and economic growth. Currently, when the exploitation of natural resources has reached its highest peak in history and society is facing a grave environmental threat, economic development that includes the application of innovation and modernization has become a key issue. The efficient use of resources creates conditions for innovation on the one hand and provides inclusiveness on the other.

Innovative development determines not only the economic paradigm, but also the nature of its individual elements. Under the influence of innovative development (for example, production that involves using 3D printers), a new industrial revolution

is taking place in our time. This new industrial revolution is affecting the service and agriculture industries and will lay the foundation for the next stage of development. In the Middle Ages, the role of the driving force of the economy was passed from agriculture to industry, with the latter, in turn, losing some of its importance with the rise of the service sector in the 20th century. The service sector now forms the largest category in highly developed economies. At the same time, the economies of countries with an average growth rate are associated with industry, and those with a low level of development mainly with agriculture. At present, the importance of industrialization has increased to the point that not only companies, but even some states are involved in “industrial espionage” in order to gain the upper hand in the industrial sphere.

Economic modernization is a process of improving the manner of thinking and behaving, the institutional environment and technological level. Over the last 300 years, economic modernization has always been in dialectical unity with industrial revolutions. The first industrial revolution began with the introduction of steam machinery in the second half of the eighteenth century. From 1870 to 1945, economic changes evolved into the second industrial revolution with the invention of electricity and the internal combustion engine and the development of trade. Under the influence of the second industrial revolution, the dominance of agriculture, which had begun in 3,500 BCE, came to an end (de-agriculturalization). From 1946 to

the 1970s, under the influence of automation and computerization, the third industrial revolution took place. Beginning in the 1970s, the fourth wave—the knowledge revolution, influenced by the informatization, greening and the effects of widespread knowledge—began. In the future, nanotechnology and bio-engineering will take economic development to the next stage. Governments need to take into account this global metamorphosis and challenges in their economic modernization policy-making. In order to avoid the fate of Gregor Samsa, the character in Franz Kafka's *Metamorphosis*, who feels guilty in the face of an absurd and meaningless existence, every state must be able to comprehend and meet the new reality of global challenges in a timely manner.

Economic modernization should be considered in light of two important macroeconomic issues. On the one hand, an optimal balance between savings and consumption must be achieved; on the other hand, the innovative nature of investment is a main condition.

The characteristic feature of the economic modernization paradigm of countries with vast hydrocarbon resources is that, at the beginning, their development is based mainly on these resources, creating a rent pathology. In fact, the exploitation of natural resources should be founded on the principle of establishing a basis for creative and innovative development. For example, oil and gas are natural resources that do not require creative development, but rather stability and stagnation. The potential for

tourism is completely different—it requires a creative approach. For example, the natural geographical advantages of Turkey are convenient for the expansion of such areas as tourism, transport and logistics. Turkey’s revenue from tourism exceeds \$25 billion US per year, which is more than Iran’s revenue in 2013 from the export of “blue fuel” (Iran owns the world’s second largest natural gas reserves). Oil and gas accelerate economic development in the short term, but lead to economic recession over the long term (if there is no economic diversification). Generating creative and innovative development, natural resources provide economic growth not in the short-term, but in the long-term period. Thus, a “resource premium” exists along with the “resource curse.”

Resources are beneficial only if they are rationally used. Therefore, we call such usefulness “latent utility.”

Another proven scientific fact is that human capital is a key factor in economic development. For example, the GDP per capita of Saudi Arabia, which has the largest hydrocarbon reserves in the world, is lower than that of Spain on the periphery of Europe, which is facing a serious economic crisis. Thus, regardless of the wealth of natural resources, human factors and institutional development are among the main reasons for this economic difference. For this reason, Ilham Aliyev, the President of Azerbaijan, a country rich in oil and gas, has defined the “transformation of ‘black gold’ into ‘human capital’” as a basic principle of economic development.

Table 8.1. Main Factors of the Development Function

Factors		Main merits	Development prospects	Typical example of a country
Natural resources	<i>Underground resources (hydrocarbon, ore etc.)</i>	Exploitation of natural resources does not require significant creativity	Positive correlation exists between the exploitation of natural resources and the rate of economic growth	Nigeria
	<i>Favorable geographical position</i>	Modernization is required	Modern transport and logistics infrastructure lays the foundation for development of other areas	Turkey
	<i>Tourism potential</i>	A creative approach is required	Along with sustainable development, it is sensitive to external shocks	Malaysia
	<i>Foreign support</i>	Characterized by access to developed markets and application of modern technology	Along with sustainable development, political challenges remain	Singapore
Human factor		Advanced modernization of social infrastructure, especially education and health, is required	Geographical factors are removed, innovative development is provided mainly for the long term	Japan
Institutional environment		People exercise freedom of expression	Sustainable and irrevocable development based on human factors and the institutional environment	USA

In fact, the time has come to lay out a new systematic scientific review of the factors in economic growth, because production

functions (Cobb-Douglas, the elasticity of substitution, etc.) cannot explain current economic development. Because production functions are limited to measuring the impact of labor and capital on manufacture, it has become necessary to develop modified and expanded forms of these functions. For example, the institutional environment, different types of natural resources, knowledge, and so forth, can be added as new production functions to the number of independent variables. In fact, the new variables will transform the production function into a new paradigm: the development function. It is important to note the economic-historical necessity for this.

The definition of production functions coincides with the period of industrialization. A production function was formulated by Charles Cobb and Paul Douglas between 1927 and 1947. In modern times, industrialization, which has lost its dominant position to the service sector, is overshadowed by the paradigm of the knowledge economy. In other words, structural and philosophical changes to the economy necessitate the transition of the production function to the development function. Because we are on the threshold of the service era, the key factors in the knowledge economy (which result in its significance) are not land or physical capital, but innovation, human capital and institutional environment. In our opinion, economic theory must focus on establishing the development function and must, to that end, discuss this subject, particularly the economic architecture for the post-crisis period:

$$D = f(K, C, L, I, G \text{ etc.})$$

Here: D - development, K - knowledge, C - capital, L - labor, I - institutional environment, G – geo-economic factor

Historically, industrial production moved geographically from the United Kingdom to continental Europe, to the United States and then to Japan. Today, modern industrialization is moving towards East Asia, including South Korea and China. However, employment is not evenly distributed between the emerging and traditional industrial forces (the powerhouses). Industrialization is largely associated with urban agglomeration. At present, the service sector prevails over the industrial sector, and the process of suburbanizing is underway.

Depending on the technological level of the manufacturing sector, attitudes toward employment and investment change. Although low-tech industries create a wide range of employment opportunities, they do not require a high capital investment. Medium and high-tech industrial sectors requiring a substantial capital investment do not offer as much employment. However, the high-tech industrial sectors provide innovative development and knowledge and skills improvement, and restart the cycle of structural change. Such development, along with capital accumulation and innovation, increases the division of labor related to service activities and enhances employment opportunities.

In developed countries, manufacturing is the main source of

finance and knowledge resources for sustainable development. Industrialization requires further development of the service sector in order to create new jobs. Empirical data shows that industrialization plays an accelerating role in the transformation of the economic structure of agrarian societies. In fact, the concept of economic growth is related to the changes that occur when countries grow rich.

Productivity also increases through modernization; the expansion of the value chain and the achievement of a higher added value reside in the nature of economic growth. According to UNIDO in 1950, in 68 developing countries, agriculture accounted for 40% of GDP, and industry accounted for only 12%. Fifty-five years later, the share of agriculture in GDP dropped to 16%, while the share of the manufacturing industry (which rose in the beginning of the 1980s to 17%) increased and then declined again. Over the years, the service sector in developing countries has increased and reached more than 10% of GDP. On the contrary, in 1950, the economies of 21 developed countries were already based on industry (more than 30% of GDP), with agriculture representing a small share (16%). In addition, the service sectors in these countries have been rising, but the sharp decline in industrialization since 2005 has led to the equalization of the industrial sector in the GDP of developed and developing countries.

Actually, economic development models in developing countries differ from each other. In the middle of the twentieth century,

for example, in China, Indonesia, Korea, Malaysia and Thailand, agriculture's share of GDP was at least 40 percent; fifty-five years later, it is a mere three to thirteen percent, with industry's share reaching more than 25 percent. However, other developing countries have experienced a different transition: in Latin American countries — Argentina, Brazil and Mexico — the dominant position in the economy shifted from agriculture to the service sector (with a nominal increase in non-manufacturing industry).

Agriculture's share of the GDP of low-income countries is high, more than the manufacturing and non-manufacturing industries put together (manufacturing, construction and utilities). As revenues increase, the structure of the economy does change in favor of industry; according to estimates, industry equals 20 percent of GDP once GDP per capita reaches \$14,000 US. In other words, economic growth is a result of the rise of manufacturing industry paired with a sharp decline in agriculture.

The paradox of the economic growth paradigm is that after reaching its peak, the development of the industrial sector starts to decline. The service sector share increases at the first stage of this development, while the share of agriculture, on the contrary, continues to drop. Non-manufacturing industries increased sharply in low-income countries and reached a stable level after rising to \$4,000 US per capita.

9. Innovation-Led Development

There are as many definitions in the literature of technological innovation as the number of supposed scientists in the field. Courvisanos (2005) argues that the following definition is most appropriate: the creation, development, and implementation of an idea derived from problem solving or the identification of opportunity that alters (innovation) the current state of theoretical and practical knowledge, skills, and artifacts (technology) in the production and delivery of economic activity. In the context of innovation, technology matters because it is the engine that drives change and economic growth. J. Schumpeter (1943) stressed (technological) competition as the true nature of capitalist competition and made this idea the cornerstone of his theory. A growing neo-Schumpeterian literature has shown that innovation has to be conceived of as a deliberate process of change based on firms' efforts, which include learning activities, management strategies and allocation of funds for R&D and investment, in order to acquire and develop knowledge, accumulate capital, and access and absorb external sources of innovation (Crespi et. al. 2006). From such a perspective, innovation is understood as an endogenous process, characterized by path dependence, localized in nature, highly idiosyncratic with respect to different firms and industries and capable of producing changes in both products and processes.

Even the "Frankenstein argument," which argues against engineered intelligent beings because of a fear of artificial human creatures, can't diminish the importance of innovation.

B. Godin (2006) explains the theoretical framework of relations between science and technology, and economic progress. The linear model of innovation postulates that innovation starts with basic research, then adds applied research and development, and ends with production and diffusion:

Basic research → Applied research → Development → (Production and) Diffusion

Higher production will further boost basic and applied research, thus creating a virtuous cycle between innovation and growth.

Building on concepts from a resource-based view of the firm and literature on organizational learning, innovation and quality, H. Cho *et. al.* (2005) propose the innovativeness-quality-performance model, which describes how a firm's ability to balance innovativeness with quality drives growth and profitability, which in turn drives superior market value. Their results of structural equation models indicate that (1) innovativeness mediates the relationship between quality and growth; (2) quality mediates the relationship between innovativeness and profitability; (3) both innovativeness and quality have mediation effects on market value; and (4) both growth and profitability have mediation effects on market value.

Many scientists have discussed and argued the taxonomy of research. According to J. S. Huxley (1968) there are four categories of research: background, basic, ad hoc, and development. OECD defines the components of research as below:

- *Fundamental research: Work undertaken primarily for the advancement of scientific knowledge, without a specific practical application in view.*
- *Applied research: Work undertaken primarily for the advancement of scientific knowledge, with a specific practical aim in view.*
- *Development: The use of the results of fundamental and applied research directed to the introduction of useful materials, devices, products, systems, and processes or the improvement of existing ones.*

Courvisanos (2005) indicates that the economic agents of institutions are the central decision-making actors in the process of technological innovation and that these agents have the power to affect the way society adapts to such innovations in three ways: (1) ability to determine the nature of the technology employed; (2) monopoly power that resides with the entrepreneurs who install the innovation, which can stifle other innovations as well as promote their own; and (3) force society to adopt the innovations they promote through organization (politics), property (rights), and individual (charisma) factors.

R.G. McGrath *et.al.* (1996) consider that in order for an innovative project to create competitive advantage, it must be able to demonstrate successful and reliable achievement of its business objectives, which suggests that it has created new “competencies.”

M. Chandrashekaran *et.al.* (1999) attempt to identify the drivers of innovation. The answer has profound implications for understanding how markets work, how firms operate in markets with varying degrees of competition, and how organizations and supply chains might be designed better, as well as for the articulation of policy, specifically, antitrust and patent law and, more generally, industrial policy in high-technology environments.

P. Mahmood *et.al.* (2004) argues that business groups in emerging economies exert dual effects on innovation. While groups facilitate innovation by providing institutional infrastructure, groups also discourage innovation by creating entry barriers for non-group firms and thereby inhibit the proliferation of new ideas. Although this was case for Korea and Taiwan during the period 1981-1995, this trend can also be attributed generally to emerging economies. Of course institutional differences between developed and developing countries in terms of market structure and industrial policies create different innovation thresholds. On the other hand, from 1981 to 1995 Korea and Taiwan were emerging (not developed) economies.

For emerging economies, P. Mahmood *et.al.* (2004) use the term “innovation infrastructure” to describe the set of resources, such as finances, talent, and technology, to which firms need access in order to undertake innovative activities. According to the World Economic Forum’s *Global Competitiveness Report*, Azerbaijan, with its improved position in terms of *basic requirements*,

efficiency enhancers, and *innovation and sophistication factors*, provides an environment for business to raise capital, hire talent, and strengthen modernization.

A dynamic theory of innovation proposed by Pennings *et. al.* (1992) incorporates know-how from various sectors and refers to elements of theory such as skills, technological convergence and innovation, networking and technology.

In analyzing whether public funds stimulate R&D activities or simply crowd out privately financed R&D, M. Almus *et.al.* (2003) argue that firms that have received public funding achieve on average a higher R&D intensity than firms belonging to a selected control group. Thus public funding reduces the price for private investors, allowing innovations to be carried out. Carty (1916) emphasizes the importance of public support for pure research.

B. Cassiman *et.al.* (2011), using a panel of Spanish manufacturing firms, show that the strong positive correlation found in the literature between a firm's productivity and its exports relates to the firm's earlier decisions on innovation, and that, when controlling for product innovation, the relationship between productivity and exports vanishes. It is a critical point for a countries like Kazakhstan, Saudi Arabia, Azerbaijan etc. which is trying to expand its non-resource exports.

10. The Impact of Certain Key Factors on Labor Productivity in European Countries

10.1. Introduction

In this chapter we analyze how three factors: R&D, government spending on education, and trade union density impact labor productivity, using data for fifteen EU countries: France, the Czech Republic, Spain, Sweden, Austria, Finland, Norway, Germany, the UK, Belgium, Denmark, Ireland, Italy, Netherlands, Portugal and Poland.

Using a panel data approach to create an econometric model is useful in evaluating the importance of regressors. Existing economic evidence demonstrates the predominantly positive effects of R&D and government spending for education on labor productivity, while trade union density has a negative impact. We therefore conclude that increased spending on modernization is likely to be an effective strategy in these countries' attempts to accelerate economic growth. Data are taken from the Conference Board Total Economy Database and OECD.

Public and private support for modernization can be justified in several ways. Czarnitzki *et.al.* (2004) stress the need for governments to provide incentives to private firms to compensate for the gap between private return on investment in innovation (in particular R&D), as it compares with returns from government expenditures, in order to ensure the socially optimal level of research and development effort by the private sector. Productivity growth as a source of growth in exports and

in the economy is important to avoid a Japanese-style stagnation trap in Europe.

10.2. Methodology

There are many factors, such as concentration of capital, improvement in skills, and improvement in efficiency that influence labor productivity. Several other authors, including Vahter (2004), Mogens Dilling-Hansen *et.al.* (1999), L. Artige and R. Nicolini (2006) have discussed the main factors driving growth in labor productivity. To find the principal determinant of labor productivity, T.C. Mishab (2009) created a model with a cross-country panel of 45 countries, using a fixed effects panel approach. Another interesting study was done by B. Francesco and P. Mario (2009) that demonstrates the effects of innovation on growth in labor productivity. The OECD defines labor productivity as “the ratio of a volume measure of output to a volume measure of input,” which means that if output grows and inputs diminish, labor productivity has increased.

Georgiou *et. al.* (2012) assume that R&D and government spending on education, as well as trade unions, are the most important factors for determining labor productivity in Western European countries. Of course, it is common sense that growth in business R&D concentration will increase labor productivity in the long run. Adding another factor, Edison (1984) states that the labor productivity is positively associated with wages.

Our model is presented in the following equation:

$$lp_{it} = c_0 + c_1 RD_{it} + c_2 Edu_GDP_{it} + c_3 tud_{it} + error_{it}$$

Variable [lp] symbolizes labor productivity per hour worked, [RD] stands for R&D in value added in all manufacturing, [Edu_GDP] is the public expenditure on education as a percentage of GDP and, finally, [tud] represents trade union density. According to Johnson (2004), trade union density corresponds to the proportion of paid workers who are union members.

10.3. Results

We observed variables for fifteen countries of the EU, called the cross-sections, for twenty consecutive years between 1990 and 2009. For these fifteen countries we want to model labor productivity (lp) as a function of the following explicative variables: R&D expenditures, trade union density and expenditures on education. Removing the space and time dimensions of the pooled data, we first ran an ordinary least squares regression. The OLS results are as follows:

$$\begin{aligned} LP &= 26.0302 + 0.0003*RD + 0.1360*TUD + 1.6034*EDU \quad (1) \\ se &= (4.626563) \quad (5.72E-05) \quad (0.056181) \quad (1.048528) \\ t &= (5.6263) \quad (6.43933) \quad (2.420152) \quad (1.529234) \\ R\text{-squared} &= 0.291462 \quad \text{Durbin-Watson} = 0.013318 \\ n &= 139 \quad \text{df} = 135 \end{aligned}$$

Having applied the conventional criteria, we prove that each of the coefficients is statistically significant. Two slope coefficients have the expected positive signs. But the positive slope of trade union density is unexpected. R-squared value is not reasonably high. The fairly low level of the Durbin–Watson statistic detects the presence of autocorrelation in the residuals. Gujarati (2004) notes that a low Durbin–Watson value could also be due to specification errors. For example, the estimated model assumes that the intercept value of the EU countries is the same. It also assumes that the slope coefficients of the regressors are identical for all countries. Evidently, these are highly limited assumptions. Therefore, according to L. Artige *et.al.* (2006/08), the pooled regression may misrepresent the relationship between labor productivity and the variables of R&D expenditures, trade union density and education expenditures across the fifteen countries. Therefore, the OLS estimator is no longer optimal.

In econometrics, the fixed effects model seems to be the most appropriate, because it doesn't need H_0 . On the other hand, we do not have large cross-sections, the time period is not small, and the cross-sectional units are not a random sample from a population, so the random effects model is not appropriate. In our case, the method of random effects gives up fixed effects, since the former has less statistical significance. Therefore, the fixed effects method is preferable.

In the fixed effects model, each country's intercept does not vary over time; that is, it is *time invariant*. The fixed effects model results are as follows:

$$LP = 54.1676 + 0.0002*RD - 0.6634*TUD + 1.9642*EDU \quad (2)$$

$$s.e. = \quad (4.092026) \quad (4.28E-05) \quad (0.069301) \quad (0.564639)$$

$$t = \quad (13.23736) \quad (5.655619) \quad (-9.572870) \quad (3.478828)$$

$$R\text{-squared} = 0.981005 \quad \text{Durbin-Watson} = 0.577058$$

But in equation (2) the coefficients of the regressors do not vary across countries or over time. We then implement differential intercept dummies. In order to avoid the dummy-variable trap, we have used only fourteen dummies, dropping the first country. There is no dummy for Austria. Thus, 58.39914 stands for the intercept of Austria and 20.91192 and 20.42748, the differential intercept coefficients, inform us how much the intercepts of Belgium and Denmark differ from the intercept of Austria. The least-squares dummy variable (LSDV) model (3) results are as follows:

Table 10.1. The least-squares dummy variable (LSDV) model results

Dependent Variable: LP

Method: Panel Least Squares

Date: 05/16/12 Time: 13:35

Sample: 1 300

Periods included: 11

Cross-sections included: 15

Total panel (unbalanced) observations: 139

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	58.39914	4.110302	14.20799	0.0000
RD	0.000242	4.28E-05	5.655619	0.0000
EDU	1.964281	0.564639	3.478828	0.0007
TUD	-0.663414	0.069301	-9.572870	0.0000
COUNTRY="Belgium"	20.91192	1.466515	14.25960	0.0000
COUNTRY="Denmark"	20.42748	3.036384	6.727569	0.0000
COUNTRY="Finland"	21.27018	2.745572	7.747084	0.0000
COUNTRY="France"	-20.51317	1.954966	-10.49285	0.0000
COUNTRY="Germany"	-16.10331	2.769518	-5.814480	0.0000
COUNTRY="Greece"	-18.04170	1.628655	-11.07767	0.0000
COUNTRY="Ireland"	4.443308	0.960905	4.624084	0.0000
COUNTRY="Italy"	-7.068468	1.109648	-6.370007	0.0000
COUNTRY="Netherlands"	-0.287323	1.151573	-0.249505	0.8034
COUNTRY="Poland"	-34.42136	1.249816	-27.54115	0.0000
COUNTRY="Portugal"	-30.03746	1.285114	-23.37338	0.0000
COUNTRY="Spain"	-17.64765	1.645225	-10.72658	0.0000
COUNTRY="Sweden"	25.25959	3.189505	7.919596	0.0000
COUNTRY="UK"	-8.533777	1.330498	-6.413974	0.0000
R-squared	0.981005	Mean dependent var		44.42736
Adjusted R-squared	0.978336	S.D. dependent var		10.94974
S.E. of regression	1.611649	Akaike info criterion		3.912702
Sum squared resid	314.2867	Schwarz criterion		4.292705
Log likelihood	-253.9328	Hannan-Quinn criter.		4.067125
F-statistic	367.5943	Durbin-Watson stat		0.577058
Prob(F-statistic)	0.000000			

The LSDV gives us more reliable and significant results than the OLS (1). The following shows results of the intercepts of the fifteen countries:

Table 10.2. Intercepts of fifteen countries

Countries	A	b	a+b
	Intercept of Austria	Differential intercept coefficients and intercepts of other countries	
	58,39914	Differential intercept coefficients	Intercepts of countries
Belgium		20,91192	79,31106
Denmark		20,42748	78,82662
Finland		21,27018	79,66932
France		-20,51317	37,88597
Germany		-16,10331	42,29583
Greece		-18,0417	40,35744
Ireland		4,443308	62,842448
Italy		-7,068468	51,330672
Netherlands		-0,287323	58,111817
Poland		-34,42136	23,97778
Portugal		-30,03746	28,36168
Spain		-17,64765	40,75149
Sweden		25,25959	83,65873
UK		-8,533777	49,865363

Sweden has the largest intercept, while Poland has the smallest. The difference among intercepts of the countries are due to the different levels of expenditures on R&D and education, the efficiency of the spending, and the dissimilar impact of trade unions. A comparison of models 1 and 3 proves the superiority of the latter. Since R^2 and the Durbin-Watson value are much higher in the third equation, one can have confidence in the third model. Using formula (4), a restricted F test can be estimated. This test discloses more invalid regression.

$$F = ((R^2_{UR} - R^2_R)/m)/(1 - R^2_{UR})/(n-k) = ((0.981005 - 0.291462)/3)/(1 - 0.291462)/(139-4) = 46.1 \quad (4)$$

R^2_R - from the restricted regression

R^2_{UR} - from the unrestricted regression

m = number of linear restrictions

k = number of parameters (including the intercept) in the unrestricted regression

n = number of observations

The F value of 46.1 is considerable and so the OLS results (first equation) are invalid.

Another type of fixed effects model could have constant slopes but intercepts that differ according to time. In this case, the model would have no significant country differences, but might exhibit autocorrelation owing to time-lagged temporal effects. The residuals in this kind of model may exhibit autocorrelation

in the process. In this case, the variables are homogeneous across countries. They could be similar in region or area of focus. For example, technological changes or national policies would lead to group-specific characteristics that may effect temporal changes in the variables being analyzed. We used the built-in period dummies and dropped the last year to bypass falling into the dummy-variable trap.

$$LP = 26.03024 + 0.00037*RD + 0.13597*TUD + 1.60344*EDU \quad (5)$$

$$s.e. = (4.626563) \quad (5.72E-05) \quad (0.056181) \quad (1.048528)$$

$$t = (5.626260) \quad (6.439333) \quad (2.420152) \quad (1.529234)$$

$$R\text{-squared} = 0.291462$$

$$\text{Durbin-Watson} = 0.013318$$

In equation (5) we use too many dummy variables and so encounter the degrees of freedom problem. To this end we have 139 observations. On the other hand, we consume 19 degrees of freedom due to 19-year dummies and 3 df for three regressors. Moreover, intercepts and slopes lose df, too.

At the same time a large number of variables create multicollinearity in equation (5). R-squared and Durbin-Watson prove that model (5) is invalid. This means that there is not any strong effect of time.

10.4. Discussion

10.4.1. The impact of R&D Expenditures on the Labor Productivity

The data show that a 100 percent increase in R&D expenditures increases labor productivity by 0.02 percent in the fifteen EU countries. Business enterprise expenditure on R&D as a percentage of GDP rose by 13.4 percent between 1998 and 2008 in the countries used in our research. R&D expenditures in these EU countries are financed by government, domestic business enterprises and from “abroad,” as well as by funding from the European Commission (through the Framework Programme and Structural Funds for R&D). The European Commission funding of Research, Technology Development and Innovation (RTDI) increased by a factor of 45 between 1985 and 2010¹.

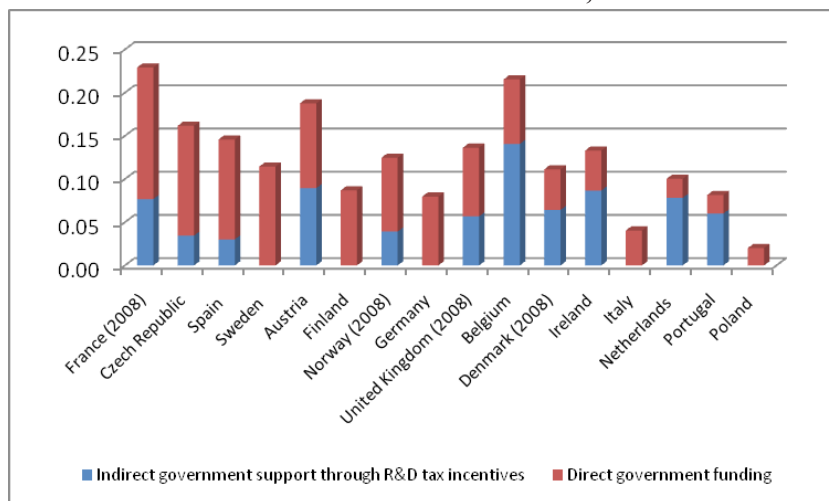
The ratio of direct and indirect R&D support differs across EU countries because each type of support is targeted at various market failures and encourages diverse kinds of R&D. EU countries use tax credits primarily to support short-term targets, while direct funding is used for longer term research. France, the Czech Republic, Spain, Sweden, Finland and Poland prefer direct government funding of R&D, comprising various components, like contracts, loans, grants and subsidies. Belgium, Denmark, Ireland, the Netherlands and Portugal rely more on indirect

¹ See DG Research and Innovation

funding. However, not only direct funding, but tax subsidies as well, stimulate companies to scale up R&D expenditures. The number of OECD countries providing R&D tax incentives increased from twelve in 1996 to twenty-one in 2008. In 2008 tax subsidies for large companies per dollar of R&D ranged from \$0.01 in Poland to \$0.4 in Spain across EU countries².

Austria strikes a balance between direct and indirect R&D funding.

Figure 10.1. Direct and indirect government funding of business R&D and tax incentives for R&D, 2007



Source: OECD, based on OECD R&D tax incentives questionnaire, January 2010; and OECD, Main Science and Technology Indicators Database, March 2010.

10.4.2. The impact of education expenditures on the labor productivity

Results reveal that a one percent increase in government spending on education raises labor productivity by 1.96 percent in the fifteen EU countries studied. Therefore, the relationship between government expenditure on education and labor productivity doesn't generate serious debate among researchers. It is clear that government expenditure on education raises the productivity of labor, diminishes production costs, and increases investment in and the productivity of business, thus fostering economic growth. D. Laudau (1986) assumes that large government expenditure has a negative impact on economic growth. But in the case of government spending on education in the European countries, we can see quite a different picture, i.e. European government officials have made a productive project out of pre-primary to tertiary education.

Because government spending on education in these countries has a more powerful impact on labor productivity, the current situation in which public funding for education is higher than public funding for R&D is justified. Public expenditure on education in the EU-27 decreased from 5.14 percent to 5.07 percent of GDP between 2003 and 2008. In 2008, government spending on education as a percentage of GDP was the highest in Denmark (7.75%), Iceland (7.57%) and Cyprus (7.41%). The lowest percentages were found in Liechtenstein (2.11%), Luxemburg (3.15%) and Slovakia

(3.59%). Private expenditure on education in the EU-27 increased from 0.64 percent in 2003 to 0.75 percent of GDP in 2008. In 2008, private spending on education as percentage of GDP was the highest in Cyprus (1.35%), the UK (1.72%) and the Netherlands (0.92%). The lowest percentages were found in Norway (0.09%), outside the EU. At the level of the EU-27, expenditure on public and private educational institutions per pupil/student increased from €5,414 in 2003 to €6,459 in 2008. In 2008, expenditure on public and private educational institutions per pupil/student was the highest in Norway: €10,084. Public expenditure on education as a percent of GDP is positively correlated not only with labor productivity, but also with per capita GDP.

10.4.3. The Impact of the Trade Union Density on the Labor Productivity

The range and representation of trade unions are one of the key factors in the scaling of labor productivity. Results show that a 1 percent increase in trade union density diminishes labor productivity by 0.66 percent in the countries that are covered in this paper, because trade unions have the power to raise wages above competitive levels. However, Moreton (1999) argues that higher union bargaining power does not necessarily lower labor productivity in unionized firms, *ceteris paribus*. There is also the Freeman and Medoff concept on the two faces of unionism. From the perspective of the “monopoly face,” trade unions have harmful

economic effects, while from the perspective of the collective voice/institutional face, trade unions have positive effects on productivity. It seems that in our research the “monopoly face” has proven dominant; that is why trade union density decreases labor productivity in the fifteen EU countries.

10.5. Conclusion

This chapter has investigated the implications of modernization, as well as trade union density, on labor productivity using data from fifteen EU countries. Our results indicate that R&D and government spending on education affect labor productivity positively, a result due to technological changes or national policies in EU countries. The EU governments invest courageously in R&D and provide a competitive incentive environment. The importance of gauging outcomes and justifying the cost obliges EU countries to be in an “assess and improve” mode. There is also the dual structure of the relationship between trade union density and labor productivity, the general outcome is that unionism shrinks labor productivity in the fifteen countries involved to our research.

According to the Lisbon Strategy, education, innovation and research are the legs of the Knowledge Triangle. The evidence shows that to make the EU the most competitive and dynamic knowledge-based economy, government spending on education and R&D should be increased.

11. Conclusion

In 1954, when Robert Aumann (2005 Nobel Prize in Economics) finished his Ph.D. thesis, he concluded that alternating knots do not “come apart,” cannot be separated. In his interview¹, the Israeli-American mathematician confessed that the result was “absolutely useless, the purest of pure mathematics.” Fifty years later, Aumann’s grandson Yakov Rosen mentioned to him the importance of “linking numbers” and knots in medicine, “Sometimes the DNA in a cell gets knotted up. Depending on the characteristics of the knot, this may lead to cancer. So, we have to understand knots.” Professor Aumann was bowled over at hearing that his idea was actually useful.

I was reading this interview with Robert Aumann, when the Ukrainian crisis topped the agenda of the world’s geopolitics and geo-economics. For reasons I couldn’t explain, the Ukrainian crisis reminded me of knotting up DNA in a cell leading to cancer. Geo-economic blocs intersecting in one country, like alternating knots, might lead to either positive or negative consequences. Alternating knots might occur either as geopolitical and geo-economic battlegrounds or breeding grounds for development. The collision of the EU-led Free Trade Area and the Russia-led Eurasian Union created the knot with negative consequences for Ukraine.

(I received from Prof. Aumann’s office letter about my book on Geo-economics. It has been written that “geo-economics is certainly an interesting and relevant subject in today’s

¹ Macroeconomic Dynamics (2005). The United States of America.
DOI: 10.1017.S1365100505050078

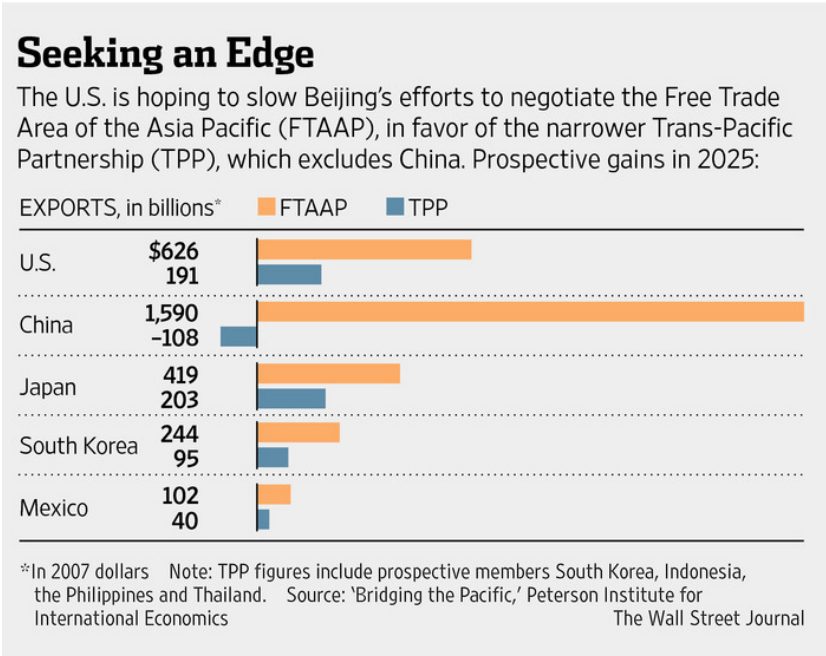
globalization era.”)

The Ukraine crisis was a new starting point for geo-economic reshuffling in the world. The idea of a Euro-Atlantic bloc stretching from Vancouver to Vladivostok was ultimately buried after the crisis. The Euro-Atlantic bloc split up along the Russia-EU border into two parts: 1. the Alliance of the U.S. and the EU; and 2. the Russia-led Eurasian Union. The U.S. and the EU are edging closer to each other to deal with Russia, and rivalry between these blocs is as bitter as it has ever been since the Cold War. China, the other rising power, is using the competition between the two blocs and seems the winner in this case. Beijing’s economic focus is towards the Asia-Pacific zone, and the Celestial Kingdom is supporting the Free Trade Area of the Asia-Pacific (FTAAP) in order to create its own economic sphere of influence. Its main rival in this zone is the U.S.-backed Trans-Pacific Partnership that is based on twelve Pacific Rim countries. Chang (2014) indicates that Beijing is irritated that Washington has used its leverage to stall Beijing’s hoped-for agreement, in order to push its own Trans-Pacific Partnership, which would create a free-trade area spanning the twelve countries. A TPP deal would cost China about \$100 billion a year in lost exports, as the partners would trade more among themselves and less with China, according to an estimate by the Peterson Institute for International Economics in Washington.

For its part, Japan initiated the ASEAN-Japan Comprehensive Economic Partnership Agreement (AJCEPA) to enable Japanese

economic power to counterbalance that of China. Chum (2014) states that Japan was shocked and surprised by the Chinese government’s proposal for the creation of the ASEAN-China Free Trade Agreement (ACFTA) and was anxious about China’s increasing influence in Southeast Asia, fearing that it would replace Japan’s long-term traditional economic, strategic, and political leadership position and role in the region.

Figure 11.1. Free Trade Area of the Asia-Pacific (FTAAP) and Trans-Pacific Partnership (TPP)



Source: The Wall Street Journal

Although at first glance China and Russia seem to be facing the Western powers together, there are a lot of (postponed) challenges between Beijing and Moscow. Backing the Silk Road Fund and the Shanghai Cooperation Organization have created leverage for China to increase its influence in Central Asia, which Moscow considers its backyard. In its turn, Moscow is using mechanisms such as the Eurasian Union, the *Commonwealth of Independent States* and the Collective Security Treaty Organization to maintain its influence in Central Asia.

China-led \$50 billion Asian Infrastructure Investment Bank (AIIB) is considered alternative to the U.S.-based World Bank and International Monetary Fund. Even U.S. traditional partners such as Japan, UK, Singapore and Taiwan had no other choice but to apply for membership in AIIB. Chinese-controlled AIIB is the challenge to the Japanese-led Asian Development Bank as well. But Japanese outward-oriented business is interested in AIIB and that was crucial to convince official Tokyo to join AIIB. AIIB, BRICS bank and Silk Road Initiatives hint a growing Chinese role in the reshuffling of international financial architecture.

Macro geo-economic powers — the U.S.-led Western bloc, the Russia-led Eurasian Union and the China-led Southeast Asia bloc will determine the geo-economic future of the world. The latter two, together with India, Pakistan, Iran and the Gulf countries comprise the Asian Powerhouse with a population of four billion. A Beijing-Moscow alliance has been codified in the form of the

Shanghai Cooperation Organization (SCO), in which China is responsible for economics and Russia is in charge of security issues. SCO could be a platform for the realization of the Asian Powerhouse.

Rising intermediate (middle) powers, such as Brazil, India, Mexico, Turkey, Indonesia, etc., can tilt the balance among the above-mentioned geo-economic powers. Emerging micro powers, including South Africa, Azerbaijan, Kazakhstan, etc., will be important actors in the regions where they are placed. Crystal (2011) considers that continued control by the Gulf Arab states over vast hydrocarbon resources, combined with their more recent prominence in international finance, will make them power brokers despite their continued vulnerability in terms of security. To this end, we put forward a new paradigm: 3M Powerism. The state powers can be broken down into three **Ms**: **Macro**, **Middle** and **Micro** powers to possess control of and command over others. Coercion is an attribute of the macro powers as a way to change the behavior of others, while the middle and micro powers prefer inducement, persuasion and exhortation to do the same thing. Generally speaking, of course, all powers (macro, middle and micro) use all methods: coercion, inducement, persuasion and exhortation. But the size of a power identifies the extent of severity of the coercion it can use to change others' behavior. More power corresponds to more harshness.

States have always used the method of “carrot and stick.” However, middle and micro powers possess more carrots in their bag, while macro powers are good at dealing with sticks. Of course, there is no transparent or strict border that defines the fence between the arsenals of these powers. As in the Stick Game, players try to hide their “bones” from the “guesses” of the other powers, causing the power to lose a “stick” with each wrong guess, eventually resulting in rendering the power harmless. Middle and micro powers usually don’t favor hard power; in contrast they exploit soft power, which comes from economy, diplomacy, culture and history.

In referring to geo-economic factors in this book, we don’t want to ignore institutional issues or issues of modernization. R. Grant (1991) and several other researchers argue that sustainable competitive advantage results from the inimitability, rarity, and non-tradability of intangible resources. So “karaoke capitalism” encourages business to generate originals rather than cover versions. Innovation is the single path that leads to competitive advantage in the market. Economic Darwinism proves the importance of innovation-backed development as a single method of survival. *Darwinian selection* explains how individuals whose behavior yields the lowest payoff (because they lag in knowledge creation) are replaced by individuals with behavior based on rational choice. On the other hand, *mutation* makes clear the probability that current behavior might be replaced by an arbitrary

behavior. The race to create knowledge affects *Darwinian selection* and *mutation* as well. The drivers of innovation exploit new market opportunities and implement new technologies to deliver successful products and services. Innovation leaders know that assets are created with intelligence.

Modernization is considered a key force in economic growth. According to N. Rosenberg, in the most fundamental sense there are only two ways of increasing the output of the economy: (1) you can increase the number of inputs that go into the productive process, or (2) if you are clever, you can think of new ways in which you can get more output from the same number of inputs.

The impact of innovation on economic growth was not a spontaneous discovery arising from the mind of one individual. Rather, it developed over time. The success of the modernization process suggests how innovation is required to vitalize economic growth and how its absence is a limitation to development.

For example, R. M. Auty (1995) observes that, despite its more favorable resource endowment, Brazil's per capita GNP has grown at half that of South Korea since the late 1960s, its life expectancy is five years less and its per capita income is barely two-thirds that of South Korea. The faster development of resource-deficient South Korea, Japan, and other nations is an inevitable consequence of an innovation-led and export-oriented model. According to Chung (2007), one of the most conspicuous

developments in investment in South Korea after the Korean War was not only the skewed investment pattern toward the modern industrial sector, but also the heavy emphasis on capital- and technology-intensive industries over time.

Thus the geo-economic factor has been one of the most important independent variables in economic development through history. The major powers have been transforming their trade policy from trade liberalization negotiations under the WTO to a strong trend to increasing free trade agreements to counterbalance each other. Targeted development funds, transport corridors, currency wars, different calibrated unions, etc., are the geo-economic leverage in states' arsenals as they exert their influence. Geo-economics will be increasing in importance as soft power, in line with the future paradigms of new regionalisms, globalization and neo-liberalism. World order is changing through economic relations, trade and investment as well.

This book makes a significant contribution to explaining geo-economics as an independent field of science. It is mainly relevant for policy-makers and academics interested in geo-economics.

I hope you have read *Geo-Economics* with pleasure!

References

Abbasov, Shahin (2013). Azerbaijan: when it comes to pipelines, it's not personal, it's strictly business. Eurasianet.org, <http://www.eurasianet.org/node/67277>.

Abramov, Denis (2014). Russia and Iran plan to reject dollar. The *Moscow Times*. <http://www.themoscowtimes.com/business/article/russia-and-iran-plan-to-reject-dollar/508115.html>.

Acemoglu, Daron, and Robinson, James (2013). *Why nations fail: The origins of power, prosperity, and poverty*. Croyden, Surrey, UK: CPI Group Ltd.

Almus M. and D. Czarnitzki (2003), The effects of public R&D subsidies on firms' innovation activities: The case of eastern Germany. *Journal of Business & Economic Statistics*, 21 (2), 226-236.

Arctic Ocean, in *Encyclopedia Britannica*, <http://www.britannica.com/EBchecked/topic/33188/Arctic-Ocean>.

Artige L. and Nicolini R. (2006/08). Labor productivity in Europe: Evidence from a sample of regions. CREPP, HEC-Management School, University of Liège: CREPP Working Paper available at:

<http://www2.ulg.ac.be/crepp/papers/crepp-wp200608.pdf>.

Auty, R. M. (1995). Industrial policy, sectoral maturation, and postwar economic growth in Brazil: The resource curse thesis. *Economic Geography*, 71(3) (Jul.), 257-272.

Bairoch, P. (1976). Europe's gross national product: 1800-1975. *Journal of European Economic History*, 5, 273-340.

BBC (2014). OPEC oil output will not be cut even if price hits \$20. http://www.bbc.com/news/business-30585538?ocid=socialflow_twitter.

Berthelsen, Christian and Cook, Lynn (2014). U.S. ruling loosens four-decade ban on oil exports. WSJ, <http://online.wsj.com/articles/u-s-ruling-would-allow-first-shipments-of-unrefined-oil-overseas-1403644494>.

Bhutta, Zafar (2014). Gwadar Port: Pakistan, China all set to develop master plan. *Express Tribune*, <http://tribune.com.pk/story/671852/gwadar-port-pakistan-china-all-set-to-develop-master-plan/>.

Blas, Javier (2014). Victim of shale revolution, Nigeria stops exporting oil to US. <http://blogs.ft.com/beyond-brics/2014/10/02/victim-of-shale-revolution-nigeria-stops-exporting-oil-to-us/>.

Blinder, Alan (2006). Offshoring: The next industrial revolution? *Foreign Affairs*, 85 (2), 113-128,

Brownstein, Ronald (2014). The war on coal is a civil war. *The Atlantic*, <http://www.theatlantic.com/politics/archive/2014/09/americas-coal-fired-divide/379782/>.

Bureau of Economic Analysis (2014). U.S. economy at a glance: Perspective from the BEA accounts, <http://www.bea.gov/newsreleases/glance.htm>.

Calder, Kent (2012). *The new continentalism: Energy and twenty-first-century Eurasian geopolitics*. New Haven CT: Yale University Press.

Carty, J. J. (1916). *The relation of pure science to industrial research*. (Reprint and Circular Series, no. 14.). Washington, D.C.: National Research Council.

CaspianBarrel (2014). Eni to sign memorandum with Turkmenistan to explore two blocs in Caspian Sea, <http://caspianbarrel.org/?p=22999>.

Cassiman B. and Golovko E. (2011). Innovation and internationalization through exports. *Journal of International Business Studies*, 42 (1), 56-75.

Chandrashekar, M., Mehta, R., Chandrashekar, R. and Grewal, R. (1999), Market motives, distinctive capabilities, and domestic inertia: A hybrid model of innovation generation. *Journal of Marketing Research* 36 (1), 95-112.

Cho, H. and Pucik, V. (2005). Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic Management Journal*, 26 (6), 555-575.

Chum, Sonya (2014). The impact of Japan's rivalry with China on its willingness to pursue free trade agreements. *Journal of East Asian Economic Integration*, 18 (3). 227.

Chung, Y. (2007). *South Korea in the fast lane: Economic development and capital formation*. Oxford, UK: Oxford University Press, p.42.

Constantin, P. D., Rivera, E. B., Rivera, Y. and Martin, D. L. (2009). Cobb-Douglas, translog stochastic production function and data envelopment analysis in total factor productivity in Brazilian agribusiness: The flagship research. *Journal of International Conference of the Production and Operations Management Society*, (2).

Conerly, Bill (2013). Future of the dollar as world reserve currency, <http://www.forbes.com/sites/billconerly/2013/10/25/future-of-the-dollar-as-world-reserve-currency/>.

Courvisanos, J. (2005). Technological innovation: Galbraith, the post Keynesians, and a heterodox future. *Journal of Post Keynesian Economics*, 28 (1). Armonk, NY: M. E. Sharpe, 83-102.

Crespi, F. and Pianta, M. (2006). Demand and innovation in

productivity growth, *International Review of Applied Economics* 22 (6), 655-672.

Crooks, E. and Kavanagh, M. (2014). Industry has its ear to the ground for a potential gusher of deals. *Financial Times*, 5.

Crooks, Ed (2014). US solar and wind start outshine gas. *Financial Times*, <http://www.ft.com/intl/cms/s/0/e8627a7a-3e82-11e4-adeb-00144feabdc0.html?siteedition=intl#ixzz3EeMXDr7m>.

Czarnitzki, D., Hanel, P. and Rosa, J.M. (2004). *Evaluating the impact of r&d tax credits on innovation: A microeconomic study on Canadian firms*. (Groupe de Recherche en Économie et Développement International, University of Sherbrooke, Working Paper 05-01), <http://pages.usherbrooke.ca/gredi/wpapers/GREDI-0501.pdf>.

Furceri, Davide and Zdzienicka, Aleksandra (2013). *The Euro area crisis: Need for a supranational fiscal risk sharing mechanism?* (IMF Working Paper, WP/13/198), <http://www.imf.org/external/pubs/ft/wp/2013/wp13198.pdf>.

Diamond, Jared (1999). *Guns, germs, and steel: The fates of human societies*. New York, NY: W.W. Norton & Company, 142.

Donilon, Tom (2013). Energy and American power. *Foreign Affairs*, <http://www.foreignaffairs.com/articles/139509/tom-donilon/energy-and-american-power>.

Doorenbos, J. and Kassam, A.H. (1979). Yield response to water. (FAO Irrigation and Drainage Paper No. 33). Rome.

Echevarria, C. (1998). A three-factor agricultural production function: the case of Canada. *International Economic Journal*, 12,(3), 63-75.

Edison, D. (1984). *Annals of the Association of American Geographers*, 74 (1), 98-123.

Elliott, Larry (2014). IMF says economic growth may never return to pre-crisis levels, *The Guardian*, <http://www.theguardian.com/business/2014/oct/07/imf-economic-growth-forecasts-downgraded-crisis>.

Erdoglu, Erken (2014). Turkey's energy strategy and its role in the EU's southern gas corridor. (IAI Working Papers 14/01). <http://www.iai.it/pdf/DocIAI/iaiw1401.pdf>.

Farrell, John (2013). Three reasons Germans are going renewable "at all costs." <http://www.renewableenergyworld.com/rea/blog/post/2013/10/3-reasons-germans-are-going-renewable-at-all-costs>. Faucon, Benoît and Said, Summer (2014). OPEC splits on response to falling oil prices. *WSJ*, <http://online.wsj.com/articles/opec-says-world-will-need-less-of-its-oil-next-year-1410348270>.

Ferdman, Roberto (2014). How the world's biggest companies

bribe foreign governments—in 11 charts. *Washington Post*, http://www.washingtonpost.com/blogs/wonkblog/wp/2014/12/03/how-the-worlds-biggest-companies-bribe-foreign-governments-in-11-charts/?tid=sm_fb.

Ferguson, Niall (2014). *Empire: The rise and demise of the British world order and the lessons for global power*. New York, NY: Basic Books.

Fleisher, B.M. and Yunhua, L. (1992). Economies of scale, plot size, human capital and productivity in Chinese agriculture. *Quart. Rev. Econ. Finance*, 32, 112-123.

Bogliacino, F. and Pianta, M. (2009). The impact of innovation on labour productivity growth in European industries: Does it depend on firms' competitiveness strategies? (IPTS working paper on corporate R&D and innovation No. 13/2009), http://iri.jrc.es/papers/13_IPTS_WP_JRC53698.pdf.

Fukuyama, Francis (2014). *Political order and political decay: From the industrial revolution to the globalization of democracy*. New York, NY: Farrar, Straus and Giroux, 232.

Gillis, Justin (2014). Sun and wind alter global landscape, leaving utilities behind. *New York Times*, http://www.nytimes.com/2014/09/14/science/earth/sun-and-wind-alter-german-landscape-leaving-utilities-behind.html?smprod=nytcore-iphone&smid=nytcore-iphone-share&_r=1

Global Research (2010). Top ten countries at risk of water shortages, <http://www.globalresearch.ca/top-ten-countries-at-risk-of-water-shortages/19996>.

Georgiou, M. N. (2012). The impact of R&D, government spending on education and trade unions on labour productivity - A panel data econometric analysis. <http://ssrn.com/abstract=1983720> or <http://dx.doi.org/10.2139/ssrn.1983720>.

Chang, Gordon G. (2014). U.S. takes on China at APEC, *Forbes*, <http://www.forbes.com/sites/gordonchang/2014/11/09/u-s-takes-on-china-at-apec/>.

Grant, R. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review* 33(3), 114-135.

Gujarati, D. (2004). *Basic Econometrics* (4th ed.). Englewood Cliffs, NJ: McGraw–Hill Companies, 641.

Hallegatte, Stephane, Green, Colin, Nicholls, Robert J. and Corfee-Morlot, Jan (2013). Future flood losses in major coastal cities. *Nature Climate Change* 3, 802–806.

Helman, Christopher (2013). Why America's shale oil boom could end sooner than you think. *Forbes*, <http://www.forbes.com/sites/christopherhelman/2013/06/13/why-americas-shale-oil-boom-could-end-sooner-than-you-think/>.

Henderson, David (2013). The relative unimportance of seigniorage, http://econlog.econlib.org/archives/2013/10/the_relative_un.html.

Hill, F. and Gaddy, C. G. (2012). *Mr. Putin: Operative in the Kremlin*. Washington DC: Brookings Institution Press, 154.

Hoekstra, Arjen (2010). The relation between international trade and freshwater scarcity. (WTO Working Paper), 4.

Huxley, J. S. (1968). *Scientific research and social needs*. London: Watts and Co. IIT Research Institute, in *Technology in retrospect and critical events in science (TRACES)*. Washington: National Science Foundation.

Ishikawa, Shigeru (1967). *Economic development in Asian perspective*. Tokyo: Kino-kuniya, 85.

Johnson, Keith (2014). Russia's quiet war against European fracking. *Foreign Policy*, http://www.foreignpolicy.com/articles/2014/06/20/russias_quiet_war_against_european_fracking.

Johnson, S. (2004). An empirical examination of union density in six countries: Canada, Ecuador, Mexico, Nicaragua, the United States and Venezuela. Washington, DC: Inter-American Development Bank, (Research Network Working Paper £R-487), 5. Available at: <http://www.iadb.org/res/publications/pubfiles/pubR-487.pdf>.

Jorgenson, D. W., Gollop, F. M. and Fraumeni, B.M. (1987). *Productivity and U.S. economic growth*. Cambridge MA: Harvard University Press.

Kissinger, Henry (2014). *World order*. New York, NY: Penguin Press, 18.

Krugman P. (2013). Godwin and the greenback. http://krugman.blogs.nytimes.com/2013/10/22/godwin-and-the-greenback/?_r=0.

Laudau, D. (1986). Government and economic growth in LDCs: An empirical study. *Economic Development and Cultural Change*, 35, 35-75.

Legrenzi, Matteo, and Momani, Bessma (Eds.) (2013). *Shifting geo-economic power of the Gulf* (International political economy of new regionalisms series). Farnham, Surrey, UK: Ashgate.

Lobosco, Katie (2014). Why Obama is pushing high-tech manufacturing. CNN. <http://money.cnn.com/2014/03/03/smallbusiness/high-tech-manufacturing-obama/>.

Lynn, Richard and Vanhanen, Tatu (2006). *IQ and global inequality*. Atlanta, GA: Washington Summit Publishers.

Mahmood, I. P. and Mitchell, W. (2004). Two faces: Effects of business groups on innovation in emerging economies, *Management Science*, 50 (10), 1348-1365.

Mahmudov, Əhməd Əkbər oğlu. The Academy of Science of Azerbaijan, <http://www.amea-iqtisadiyyat.org/ehmed-mahmudov.htm>.

Maini, Tridivesh Singh, and Vaid, Manish (2013). Roadblocks remain to TAPI pipeline construction. *Oil&Gas Journal*.

Maplecroft (2010). Water security risk index 2010. <http://maplecroft.com/about/news/water-security.html>.

Maugeri, Leonardo (2013). The shale oil boom: A U.S. phenomenon, *The geopolitics of energy project*. Harvard Kennedy School, Belfer Center for Science and International Affairs, <http://belfercenter.ksg.harvard.edu/files/draft-2.pdf>.

McCord, Gordon and Sachs, Jeffrey (2013). Development, structure, and transformation: Some evidence on comparative economic growth. (Working Paper 19512), National Bureau of Economic Research, Cambridge, 20.

McGrath, R. G., Tsai, M., Venkataraman, S. and MacMillan, I. C. (1996). Innovation, competitive advantage and rent: A model and test. *Management Science*, 42 (3), 389-403.

Mearsheimer, J. J. (2001). Anarchy and the struggle for power. In: *The tragedy of great power politics*. New York, NY: W.W. Norton.

Mekonnen, M.M. and Hoekstra, A.Y. (2011). National water

footprint accounts: The green, blue and grey water footprint of production and consumption. (Value of Water Research Report Series No.50), UNESCO-IHE

Misbah, T.C. (2009). Determinants of labor productivity: An empirical investigation of productivity divergence. Groningen, The Netherlands: University of Groningen, 5. <http://www.eea-esem.com/files/papers/EEA-ESEM/2009/2782/Determinants%20of%20Labor%20Productivity.pdf>.

Dilling-Hansen, Mogens, Eriksson, Tor, Madsen, Erik, S., and Valdemar, S. (1999). The impact of R&D on productivity: Evidence from Danish manufacturing firms. Danish Institute for Studies in Research and Research Policy. <http://www.afsk.au.dk/ftp/workingpapers/wp99-1.pdf>.

Moreton, D. (1999). A model of labour productivity and union density in British private sector unionised establishments, Oxford Econ. Pap. 51, Oxford, UK: Oxford University Press, 322-344.

Mittelhammer, R.C., Douglas, L. Y., Damrongsak, T., John, T.D. (1980), Mitigating the effects of multicollinearity using exact and stochastic restrictions: The case of an aggregate agricultural production function in Thailand. *American Journal of Agricultural Economics*, 62 (2), 199-210.

Moller, Lars Christian (2005). *Transboundary water conflicts over hydropower and irrigation: Can multilateral development*

banks help? Nottingham, UK: Centre for Research in Economic Development and International Trade, University of Nottingham.

Morse, Ed (2014). Winners and losers from oil price plunge. *Financial Times*,. <http://www.ft.com/intl/cms/s/2/a02c1cde-538b-11e4-929b-00144feab7de.html?seid=0100320#axzz3GCM7DsMl>. Mueller, Antony (2012). *Inflation Targeting Hits the Wall*. Auburn, AL: Mises Institute, <http://mises.org/library/inflation-targeting-hits-wall>.

Nagy, Thomas (2001). The secret behind the sanctions: How the US intentionally destroyed Iraq's water supply. *The Progressive*, <http://www.progressive.org/news/2001/09/5166/secret-behind-sanctions-how-us-intentionally-destroyed-iraqs-water-supply>.

Natural gas, (2014). Interest in Turkmen natural gas heats up. <http://www.naturalgaseurope.com/turkmenistan-natural-gas-export-routes-west-south>.

Nasab, E.H. and Aghaei, M. (2009). The effect of ICT on economic growth: Further evidence. *International Bulletin of Business Administration*, issue 5, 1.

Naveed, Amjad and Shabbir, Ghulam (2006). Trade openness, FDI and Economic Growth. *Pakistan Economic and Social Review XLIV*, 137-154.

Nicola, Stefan (2014). Renewables take top share of German

power supply for first time. Bloomberg. <http://www.bloomberg.com/news/2014-10-01/german-renewables-output-tops-lignite-for-first-time-agera-says.html>. — Measuring productivity; measurement of aggregate and industry-level productivity growth. *OECD Manual*.

OECD (2004). The economic impact of ICT, measurement, evidence and implications, <http://browse.oecdbookshop.org/oecd/pdfs/free/9204051e.pdf> (last visited on December 7, 2012).

ODI (2002). Financing transboundary water management. (Water Policy Brief 2). London: Overseas Development Institute.

Pennings, M. J. and Harianto, F. (1992). Technological networking and innovation implementation. *Organization Science*, 3 (3), focused issue: *Management of technology*, 356-382.

Philips, Matthew (2014). Can the U.S. double its crude exports in a year. *Business Week*. <http://www.businessweek.com/articles/2014-07-28/can-the-u-dot-s-dot-double-its-crude-exports-in-a-year>.

Philips, Matthew (2014). The fight to export U.S. *Business Week*, <http://www.businessweek.com/articles/2014-07-10/u-dot-s-dot-oil-export-ban-the-debate-heats-up>.

Pudasaini, S. P. (1983). The effects of education in agriculture: Evidence from Nepal, *American Journal of Agricultural*

Economics, 65 (3). Oxford University Press on behalf of the Agricultural & Applied Economics Association, 509-515.

Pyper, Julia (2014). *European Union sets ambitious 2030 climate and energy goals*. Greentechmedia, <http://www.greentechmedia.com/articles/read/european-union-sets-ambitious-2030-climate-and-energy-goals>.

Reese, Laurie (2014). Energy storage: A different view from Germany. <http://www.renewableenergyworld.com/rea/blog/post/2014/06/energy-storage-a-different-view-from-germany>.

Rickards James (2011). *Currency wars: The making of the next global crisis*. New York, NY: Penguin Group.

Rogoff, Kenneth (2014). China's inscrutable contraction, <http://www.project-syndicate.org/commentary/questioning-chinese-economic-climate-by-kenneth-rogoff-2014-10>.

Rosecrance, Richard (1999). *The rise of the virtual state: Wealth and power in the coming centuries*. New York, NY: Basic Books.

Rosenberg, Nathan (2004). Innovation and economic growth. Stanford University, <http://www.oecd.org/cfe/tourism/34267902.pdf>.

Roth, Andrew (2014). In diplomatic defeat, Putin diverts pipeline to Turkey. *The New York Times*, http://www.nytimes.com/2014/12/02/world/europe/russian-gas-pipeline-turkey-south-stream.html?_r=0.

Sands, David R. (2001). China suspected in port deal. *The Washington Times*.

Sau, R.K. (1971). Agricultural revolution by production function. *Economic and Political Weekly*, 6 (26).

Scott, H.G., and Smyth, D. J. (1970). Demand for farm machinery: Western Europe. Ottawa: (Royal Commission on Farm Machinery, Queen's Printer, Study No. 9)

Burke, Sharon E. (2014). Powering the Pentagon: Creating a lean, clean fighting machine. *Foreign Affairs*,

<http://www.foreignaffairs.com/articles/141207/sharon-e-burke/powering-the-pentagon>.

Courvisanos, Jerry (2005). Technological innovation: Galbraith, the post Keynesians, and a heterodox future. *Journal of Post Keynesian Economics*, 28 (1), 83-102.

Sheth, Jagdish and Sisodia, Rajendra (2006). *Tectonic shift: The geoeconomic realignment of globalizing markets*. Delhi: SAGE Publications Pvt. Ltd.

Schumpeter, J. (1943). *Capitalism, socialism and democracy*. New York, NY: Harper, 84.

Smith, Angela Macdonald (2014). How Australia can win the LNG war. *Financial Review*, http://www.afr.com/p/business/companies/how_australia_can_win_the_lng_war_

cmCs1Ps030RYSCxMuycuyN.

Standish, Reid (2015). Putin's Eurasian dream is over before it began. *Foreign Affairs*.

Stiglitz, Joseph (2010). *Freefall: America, free markets, and the sinking of the world economy*. New York, NY: W. W. Norton & Company, 210.

UNCTAD (2011). *World investment report 2012: Towards a new generation of investment policies*. Geneva: UNCTAD, 62.

Tuğba, Evrim Maden (2014). IŞİD'in su kaynaklarını bir silah olarak kullanması, ORSAM Water Program, <http://www.orsam.org.tr/tr/yazigoster.aspx?ID=5200>.

Vard, Diana (2014). Putin's quip on political blackmailers, Ukrainian deadlock and Moscow's position, <https://politsource.wordpress.com/2014/10/29/putins-quip-on-political-blackmailers-ukrainian-deadlock-and-moscows-position/>.

Vahter, P. (2004). The effect of FDI on labour productivity: Evidence from Estonia and Slovenia. Tartu University Press available at: <http://www.mtk.ut.ee/doc/febawb32.pdf>.

Vasagar, Jeevan (2014). Berlin prepares to allow fracking. *Financial Times*, <http://www.ft.com/intl/cms/s/0/20201c36-f7db-11e3-baf5-00144feabdc0.html#axzz3EOuKnLUb>.

Wallerstein, Immanuel (1974). *The modern world system: Capitalist agriculture and the origins of the European world economy in the sixteenth century*. New York, NY: Academic Press.

Woolsey, R. James and Korin, Anne (2014). How to hit Putin where it hurts. *WSJ*, <http://online.wsj.com/news/articles/SB10001424052702304101504579546181450642264>.

Yellen, Janet L. (2014). Monetary policy and financial stability. (2014 Michel Camdessus Central Banking Lecture). Washington DC: International Monetary Fund.

Zabavina, Yuliya (2014). Moody's предсказал рекордное падение золотовалютных резервов в России, RBK, <http://top.rbc.ru/economics/15/09/2014/949061.shtml>.

Zakaria, Fareed (2011). *The post-American world*. New York, NY: W. W. Norton & Company, 240-241.

Geo-Economics

Vusal Gasimli
