Regional Research Institute

Working Paper Series

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By: Hodjat Ghadimi, Professor, West Virginia University

Research Paper Number 2010-18

Website address: rri.wvu.edu

Submitted to the Western Regional Science Association
49th Annual Cosmic Convergence
Sedona, Arizona
February 21-24, 2010

Sustainable economic development in energy rich economies: A regional approach

By

Hodjat Ghadimi
Regional Research Institute, West Virginia University
886 Chestnut Ridge Road, PO Box 6825
Morgantown, WV 26506-6825 USA
Email: Hodjat.Ghadimi@mail.wvu.edu
Tel: (304)293-4101, Fax: (304)293-6699

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There is an extensive literature on or relating to development issues of energy rich economies – particularly those in the developing world. While national-level studies abound, the analyses of these economies at a regional level or with a regional and spatial perspective are scarce. Generally, a bottom up regional approach to development and the value of insights that regional models and comparative regional studies provide have not received sufficient attention in the field of development economics. Analyzing development sustainability in energy rich economies at a regional scale may provide insights not otherwise possible. National scale studies and models are mostly sectoral and generally ignore interesting development issues arising from spatial organization of production, distribution of physical and human capital over space, and spatial factors affecting the diversification of capital base. These studies mostly focus on developing economies while a regional perspective can cut across all energy rich economies in both the developing and developed world. A regional perspective can open doors to contributions from multidisciplinary spatial scientists from a wide range of fields including geography, planning, regional science and regional economics. Finally, using sub-national regions as units of analysis provides a richer picture of development at the national level and can shed light on important issues dealing with global sustainable development. In this paper we discuss why 'region' may provide a more flexible unit of analysis for energy rich economies; present a general development framework based on constancy of total capital stock; and outline a comprehensive knowledge base for *energy rich regions* that can be used to derive patterns of development, do comparative studies, and address some geo-economic and geopolitical issues that are integral to the world energy system.

1. Energy Rich Regions

Energy rich regions (ERRs) are regions endowed with substantial reserves of exhaustible energy resources - our focus here is on oil and gas[1]. Both onshore and the closest offshore reserves are included in energy resource endowments of a region. The exploitation of energy resources has played an important role in the development of ERRs and many of these regions depend primarily on the extraction of exhaustible resources for their economic wellbeing. ERRs are very diverse and are located in clusters across the globe. Geographically they spread from the arctic to the tropics, from the extremely cold areas of Siberia and Alaska to the hot deserts of Saudi Arabia. They fall under a wide spectrum of economic systems from planned to market economy, and their reserve size varies as does their level of dependence on resource revenues. The basic scale of an ERR could be a state or province within a country but at a larger scale and depending on the focus of the study an ERR can cross the borders of two or more countries.

There is a combination of two features that distinguish the ERRs from other regions. First, no other commodity has the importance that these energy resources have in the global economy. The strategic and heavy dependence of the world on oil, and increasingly on natural gas, has created a market advantage that no other exporter enjoys. Of course, the development of a cheaper and more efficient renewable source of energy could quickly replace oil and gas as the world's preferred sources of energy, as once oil replaced coal. Second, and more important, oil and gas, like a number of other natural resources, are *exhaustible*, i.e. these regions cannot consider resource revenues as a permanent stream of income. Therefore, while among these ERRs there is a considerable variation on a number of characteristics, including oil and gas endowment, they all enjoy a finite resource with a strong world market demand and all have the common problem of converting their natural capital into reproducible capital in pursuit of sustainable economic development that is also environmentally sustainable.

There is an extensive literature on or relating to development issues of energy rich economies – particularly those in the developing world – but most of this literature focuses on national economies. Examples include (1990, Repetto 1992, Repetto 1996, Benjamin et al. 1989, Auty 2001, Sachs and Warner 1999, Gelb 1988, Heal and Chichilnisky 1991, Sachs and Warner 1995, Sachs and Warner 2001, Gylfason 2000, Gylfason 2001, Askari 2006, Lederman and Maloney 2007, Torvik 2007, Ploeg 2008, Corden 1984, Wijnbergen 1984, Matsen and Torvik 2005, Hartwick 1990, Uno and Bartelmus 1998, Hamilton and Clemens 1999, Blitzer and Eckaus 1986, Jorgensen and Wilcoxen 1991, Manne and Rutherford 1994, Bohringer and Rutherford 1997). Although national level studies abound, the analyses of these economies at a regional scale, or with a regional and spatial perspective, are scarce. A bottom up regional approach to development and the value of insights that regional models and comparative regional studies provide have not received the attention they deserve in the field of development economics.

[1] We often use oil to refer to oil, gas, and condensates together.

There are signs this may be changing. There is a surge of research interest in analyzing spatial aspects of development and underdevelopment. This is evidenced in increasing popularity of emerging fields such as 'new economic geography' (Krugman 1995, Fujita et al. 1999, Venables 2005) and 'spatial econometrics' (Anselin 1988, Anselin et al. 2004). For example, the 2009 *World Development Report*, the influential annual World Bank publication, focuses on spatial disparities and development policies. The report underscores the significance of economic geography and documents how this is changing through three dimensions of 'the increase in *density* of economic activity, the decline of *distance* between economic agents and markets, and the persistence of *division* between and within countries due to natural, cultural and policy-related barriers.'[2] A growing interest in spatial analysis is also evident in the wide and varied applications of geographic information systems, remote sensing, and spatial knowledge systems in analyzing urban and regional development processes. Some business and management visionaries have argued that "region states" has replaced nation states as the organizing economic units of the global economy and others that consider the mega-regions as a new economic unit (Mellander and Florida 2007). Still other economists and political scientists see the rise of regional blocs such as European Union (EU), the Association of South East Asian Nations (ASEAN), and the North American Free Trade Agreement (NAFTA) as a sign of the rise of regionalism.

Analyzing sustainability of development in energy rich economies at a regional level provide insights that are not evident otherwise. National level studies and models are mostly sectoral and ignore interesting development issues arising from spatial organization of production, distribution of physical and human capital over space, spatial factors affecting the diversification of capital base, and spatial disparities. These national studies mostly focus on developing economies while a regional approach can cut across a number of energy rich economies in both the developing and developed world. A regional perspective can open doors to contributions from multidisciplinary spatial scientists from a wide range of fields including geography, planning, regional science and regional economics. Finally, this approach provides a flexible unit of analysis where a region at the most disaggregated level can be defined as a sub-national territory and at an aggregated level can cross national borders and encompass parts or all of many countries, e.g. Persian Gulf region or Caspian region. Analysis at a sub-national level provides a richer picture of development – illuminating important issues that may be lost at national level and can address issues of regional disparity within a country – while analysis at a larger aggregated regional level provides a suitable framework to study the impact of development on individual countries affected by energy infrastructure megaprojects, and shed light on important sustainable development concerns at a global level.

Since the advent of the modern commercial energy sector, immense investment has been made in ERRs' infrastructure to exploit exhaustible energy sources. This fossil fuel-based energy infrastructure is unevenly spread around the world. Its spatial characteristics are determined by i) the location of ERRs and end users, and ii) development and transportation costs. As the reserves of exhaustible resources are

[2] http://siteresources.worldbank.org/INTWDR2009/Resources/Outline.pdf

located in specific regions the incidence of viable renewable resources is also region specific. These two sets of primary energy regions do not necessarily overlap. An important question is: how well can the infrastructure created for the exhaustible resources could accommodate renewable resources as the world moves towards a sustainable energy system. Can oil-based regions during the transition process become 'energy regions' so as to make the best use of existing global energy infrastructure? Clearly, the world will need to rely on a combination of both exhaustible and renewable resources in the foreseeable future. Some three fourths of the reserves of oil and gas, the dominant energy source, are to be found in a few energy producing regions in the developing world while the major energy consuming regions are the OECD countries with the recent additions of China and India as major consumers. These two distinct groups of regions - the net energy exporters and the net energy importers – are crucial to global economy and have significant impact on energy dynamics. This peculiar geography of energy supply and demand, corresponding volatile trading system, and the spatial characteristics of global energy infrastructure pose important geo-economic and geopolitical questions that could only be best addressed using a regional/spatial approach.

The International Energy Agency (IEA) has estimated that $26 trillion in new infrastructure will be needed by 2030 to ensure the flow of energy to satisfy anticipated worldwide demand. Clearly, regions endowed with energy resources will get the bulk of these investments. Which resource rich regions will attract these megaprojects? How is the size and production stage of oil and gas reserves related to the magnitude of megaprojects? How will these investments change the structure of regional and global economy and the composition and configuration of physical and human capital? Can these investments bring sustainable development to resource rich regions? What can newly developed resource regions learn from the experience of regions that have already received trillions of dollars over the past 150 year history of commercial energy? Can energy rich regions in the developing world learn from the experience of those in developed countries? For example, can we apply what we learn from the experience of Texas, Alaska, Calgary, and the North Sea to oil regions in the Middle East, East Asia or in Latin America? What policy advice must be given at the national level to help integrate oil regions with rest of the economy and to use these regions, that are integrated with global economy, to increase the level of integration of the respective national economies? What guidelines should govern national investment policies, and foreign borrowing for non-energy infrastructure to compliment sustainable development in oil regions? How can development in oil regions help national level poverty eradication policies?

To answer some of these questions, we present in the next section a general framework for sustainable development in energy rich regions. This is based on constancy of total capital stock and addresses the common development issue of these economies to convert their valuable but exhaustible natural capital into reproducible physical and human capital in pursuit of sustainable economic development that is also environmentally sustainable. Given the diversity of these regions, in section 3 we outline a comprehensive knowledge base that includes geographic, geo-economics,

and geopolitical dimensions of development in ERRs. This knowledge base can be used to derive patterns of development and can serve as a basis comparative studies and qualitative and quantitative analyses of sustainable development in these regions within a global context.

2. Sustainable development in ERRs

An issue central to sustainability is achieving an equitable balance between present and future generations. Solow (1974) in his pioneering paper formally analyzed the issues surrounding intergenerational equity for exhaustible resource-based economies. Hartwick (1977) states that to ensure intergenerational fairness, i.e. constant flow of consumption over time, it is necessary to invest the entire economic rent from an exhaustible resource in reproducible capital. Solow (1986) shows that Hartwick's rule can be interpreted as one of holding a total stock of capital constant over time as a condition for intergenerational equity in the depletion of exhaustible resources. More recently, Hamilton and Hartwick (2005) build on previous works and link investing exhaustible resource rents to growth in a model of optimal savings. In essence this literature suggests that an energy rich economy should at least maintain a non-decreasing stock of total capital by diversifying its capital base to compensate for depletion of its oil and gas resources.

Recent World Bank studies have suggested a broad framework for valuation of natural, physical and human capital, thus providing a framework for a better understanding of sustainable – or unsustainable – development in an economy (World Bank 2006). With these efforts sustainable development has become more comprehensive and measurable. The World Bank study defines sustainable development as "a process of managing a portfolio of assets to preserve and enhance the opportunities people face." The assets in this definition include physical capital, also called *produced capital*, *natural capital*, and *intangible capital* which broadly includes human capital and the quality of formal and informal institutions[3]. The condition, therefore, for sustainable development is that all these assets grow over time – or at least do not decrease. This is similar to the concept of *constancy of total capital stock*, as mentioned above, more comprehensively offering a new statistical indicator "genuine saving rate" or "genuine investment rate" as the main indicator for sustainable (or unsustainable) development. The genuine saving (investment) rate improves standard measures of wealth accumulation by adjusting the traditional saving rate downward by an estimate of natural resource depletion and pollution damages, and upward by growth in the value of human capital. This rate 'has become a central focus in the measurement of the sustainability of an economy' (Hamilton and Hartwick 2005). Precursor to "genuine saving rate", an early theoretical framework for properly calculating national product and

[3] Some authors adding social and organizational capital as a separate category have suggested wealth creation as "the process of using the four types of capital in combination to give rise to flows of goods and services which people want, in such a way that the capital stocks and the non-monetary flows of services from natural capital, are maintained or enhanced in quantity or quality." EKINS, P., SIMON, S., DEUTSCH, L., FOLKE, C., DE GROOT, R. (2003) A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecological Economics,* 44**:** 165-185

implied savings rate for an exhaustible resource-based economy was formulated using the concept of “The Golden Rule” in national income accounting (Askari 1990). This concept properly accounts for investment activities in a dynamic economy and most commonly it is interpreted as the largest “permanently maintainable amount of consumption”. Askari (1997) offers sustainable Net National Production and savings rate calculations for the oil rich Gulf Cooperation Council (GCC) member countries including Saudi Arabia, United Arab Emirates, Kuwait, Bahrain, Qatar, and Oman.

Constancy of total capital stock and the World Bank notion of development as a “process of portfolio management” provide a broad framework to study the economic development in an ERR where its most valuable assets are exhaustible natural resources. Sustainable development in an ERR crucially depends on managing its finite resources and its ability to transform its natural capital into reproducible physical and human capital - in the broad sense of intangible capital. Tracking the interplay of these three forms of capital overtime and finding their optimal size provides important insights about the nature of development in ERRs. Ghadimi (2007) presents an optimal depletion computable general equilibrium (CGE) model as a quantitative analytical framework to study oil economies and Ghadimi (2008) outlines application of this model at regional level to analyze three forms of capital. In the next section we present a regional approach to place the sustainable development of an ERR in a broader context of the development pattern of such regions around the world.

3. A multiregional global context

Although ERRs have the common problem of converting their valuable but exhaustible natural capital to other forms of reproducible capital, they have otherwise very diverse characteristics. The sizes and compositions of their resource endowments are very different. Their location with respect to major consuming regions, and thus distance and mode of transportation and the required infrastructure, varies widely. ERRs experience different stage of growth and fall under very diverse political/institutional frameworks. This diversity clearly shows the multifaceted nature of development in ERRs and the need for a multiregional global context, incorporating a systems approach to go beyond economic factors to include geographical and socio-political dimensions to provide an appropriate framework for studying sustainability. Such a framework and a comprehensive compendium of information on ERRs around the world not only helps in launching development programs in a particular region but can also profoundly facilitate a learning process among these regions. Storper (1995) discusses issues of territorial development in the context of a global learning economy and Florida (1995) maintains that the regions that grew by extracting natural resources and mass produced commodities now must harness knowledge and ideas and in effect become *learning regions* to keep economic advantage. ERRs at early stages of development can learn from the experience of those that have successfully moved from dependence on exporting a primary resource to a more diversified economy based on reproducible physical and human capital. Quality of institutions and governance, corruption, internal conflicts and other political economy issues play an important role in development

process of resource abundant economies. Van der Ploeg (2008) provides a comprehensive survey of the empirical and theoretical research on resource rich economies and highlights important political economy issues. Torvik (2007) discusses some reasons behind the wide variation in performance of resource abundant economies. We discuss geopolitical aspects later in the paper.

Development economists have long searched for **patterns** that relate successful **development**[4] to structure and policy at the national level. Numerous studies have drawn stylized facts and patterns of development at the national level. These patterns are helpful in policy making for a particular group of countries or to put development issues of a single country in a broader context. See for example (Chenery and Syrquin 1975, Branson et al. 1998). But no such work has been done at a regional level. In a similar vein we suggest using regions as units of analysis to derive 'patterns of development' and appropriate 'development metrics' in a multiregional approach to sustainable development in ERRs. The national level studies primarily have focused on a detailed economic structure defined by a number of macroeconomic indicators such as sectoral shares of GDP, trade intensity, or financial market development. In our regional approach we extend the framework to include important *geologic, geographic and geopolitical* dimensions in addition to economic factors. For this purpose, at the Regional Research Institute we have used ERRs as a flexible regional scale to construct a comprehensive knowledge base. This knowledge base combines both spatial and non-spatial data and information related to ERRs under three main sets of indicators: *geologic, geo-economics, and geopolitics.* This regional/spatial knowledge base is used to derive stylized facts and a pattern of development in ERRs and lays the foundation for further quantitative and qualitative analyses. In the next sections we describe these three sets of indicators and the way they relate to the three forms of capital.

Geologic Indicators: Reserve size

Petroleum geologist Walter Youngquist (1997) in his book *Geo Destinies* writes "The destinies of all nations and all people are in many ways bound up with the mineral and energy mineral resources of the Earth. Events of the geologic past have richly endowed some nations with valuable Earth resources, whereas others have very few. The result is markedly different destinies for different nations." The Earth's mineral riches are distributed unevenly over the globe and this has provided different regions with opportunity to achieve great power and affluence with the development of their resources. Geologic factors play a crucial role in the development process of an ERR. The most important factor is the size of a reserve, which determines the scale of initial investments and the duration of resource age. The longer the period of resource exploitation, the more enduring is the impact on the regional economic structure and its development. Often in the case of smaller reserves energy boomtowns have turned into ghost towns soon after the resources are depleted. The other geological factors,

[4] The classic work of Chenery and Syrquin (1975) points out "a development pattern may be defined as a systematic variation in any significant aspect of the economic or social structure associated with a rising level of income or other index of development."

broadly affecting the quality of the resource endowment and its cost of extraction, such as depth, age, dominant resource whether oil, gas, or condensate and share of each resource in total reserves, and chemical qualities generally characterize the most important *natural capital* of the region. The size of reserves and other geological factors have direct bearing on the amount and qualities of physical and human capital needed to exploit the resource and determine the duration of resource depletion in the region.

Geo-economic Indicators

All regions around the world have energy input requirements and some regions, such as ERRs, are also suppliers of energy. The two distinct groups of regions with crucial significance to global energy dynamics are the major *energy producing* (net energy exporters) and the dominant *energy consuming* regions (net energy importers). The most common flows between producing and consuming regions are energy, either in crude or refined form, in one direction and capital inflows, investments and technology in the other (Figure 1). Our focus is on a subset of energy producing regions endowed with significant reserves of either of two exhaustible resources - oil and gas. The oil and gas reserves often coexist and are concentrated in a small region of the world showing a very different geological structure than that of other energy sources such as coal. Distinctively separating energy producing and energy using regions, oil and gas have a volatile trading system and pose more urgent challenges than coal that is abundantly found in the major energy consuming regions of the world. Oil and gas are the dominant energy sources of the world; the existing energy transportation and transfer infrastructure, largely shaped by the requirements of these resources, links ERRs and consuming regions. Distance, proximity, and spatial layout of energy transportation infrastructure – whether pipelines or shipping – are important factors that are captured and measured in the geographical dimension of ERR knowledge base and analytic framework.

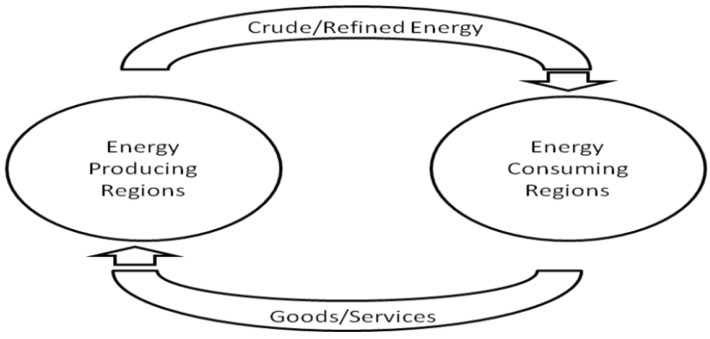

Figure 1 – Flows between energy producing and consuming regions

ERRs not only have different geographies but each region, depending on the date of resource exploration, falls at a different stage of economic development. Rostow (1960) in his theory of growth identifies a sequence of well-defined stages that a national economy passes through in its economic development process. These stages include traditional society, precondition for take-off, take-off to sustained growth, drive to maturity, and age of high mass consumption. Parr (2001) explores Rostow's stages of economic growth thesis in regional terms with three distinct perspectives of *regional*,

multiregional, and *interregional*. Our focus here is on a regional perspective with no direct reference to national economy or other regions within a nation. The stages theory focuses on national economy and generalizes the sequence that any economy in modern history follows. But in the case of ERRs a certain and measurable pattern of resource exploitation strongly shapes and influences the production level and thus the economic growth of the region. We consider this common path of resource depletion and, similar to Rostow's theory, impose a five stage economic growth sequence to an energy resource based region (Figure 2). In this case the leading sector is energy resources, but often with initially very weak forward and backward linkages with other sectors of the regional economy.

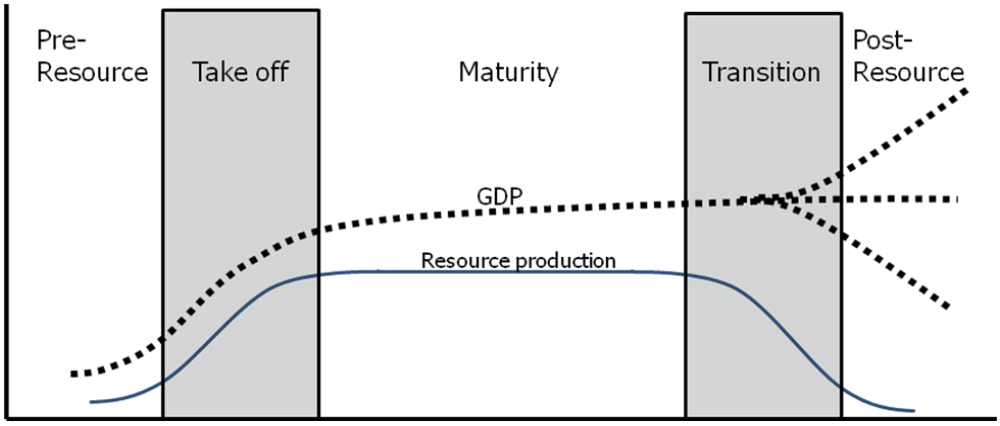

Figure 2 – Stages of resource depletion and regional growth

If we look at resource exploitation stages, once a reserve is explored a substantial investment in the form of megaprojects puts in place the required infrastructure – rigs, machinery, roads, pipelines, communication systems, and a whole host of supporting residential and non residential buildings – to start the production. This *take-off stage* is a transitional period from traditional *pre-resource* time where in addition to an accelerated creation of physical capital there is a large inflow of highly skilled labor from outside of the region. The investments continue to flow in until the full maximum production capacity of resource extraction is realized. After this short duration of take-off a longer *stage of maturity* starts where a plateau of resource production is reached. The duration of this maturity stage depends on the size of the reserve and the level of extraction and may last for decades. This is the crucial stage where the region pays off returns to investments made during take-off stage, maintains and expands resource production capacity, and most importantly has the opportunity to convert its valuable natural resources into reproducible forms of physical and human capital to ensure a sustained growth after the resource is gone. After passing a peak (some argue that globally we are approaching or have passed this peak) resource production declines during a transition period to *post-resource stage*. At this transitional period, the fortunes of the region may continue steadily, fall precipitously, or even increase depending on the quality of region's institutions, level of diversification, and the degree of success (or the extent of failure) in converting its exhaustible natural resource into reproducible

capital during the maturity stage. The total accumulated reproducible capital has reached a threshold level if the economy can sustain its production level after the transition period and into post-resource stage. At this stage, with successful diversification of its export base to non-resource sectors the region loses its identity as a energy rich region and with long-term factor mobility becomes fully integrated into national and global markets.

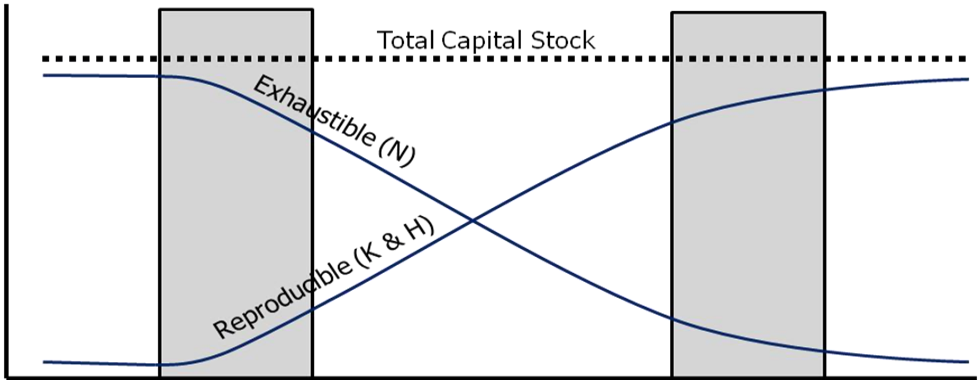

Figure 3 – Stages of capital stock conversion

Figure 3 schematically shows stocks of exhaustible natural capital (N) and reproducible physical (K) and human (H) capitals in different stages. The outcome of converting exhaustible into reproducible capitals determines the economic performance and sustainability of development in an ERR.

Regardless of their performance, the existing ERRs in advanced economies or in the developing world can be classified under these growth stages. For example, in North America Pennsylvania, Oklahoma, Texas, and Alaska fall in post-resource, transition, maturity, and take-off stages respectively. Similarly, in the Middle East, most regions like Khuzistan in Iran, Jobail in Eastern Saudi Arabia are in their maturity stage approaching the second transition stage. Areas like South Pars and Caspian Sea are in take-off stage and there are numerous smaller regions that have passed their resource age.

Geopolitical Indicators

Oil and gas have been an important concern of the world economy and geopolitics of our time. There is an extensive literature on whether natural resources are a curse or a blessing (For an overview see (Ploeg 2008, Sachs and Warner 2001, Gylfason 2001). A large part of this literature deals with the relationship between political corruption and economic performance in resource rich economies and suggests that resource rents lead to an increase in corruption depending on the quality of institutions (e.g.,(Leite and Weidmann 2001, Sala-i-Martin and Subramanian 2003, Isham et al. 2005). An important indicator showing the structure of power and the nature of socio-political institutions in ERRs is where they fall on a bipolar economic spectrum (Figure 4). At one end of this scale are centrally planned economies based on the concept of socialism where

resources are controlled and allocated by the state - a command economy. The other end of the scale is the free market economy based on capitalism where the 'invisible hand' of the price mechanism determines resource allocation. There is no purely planned or purely market economy, rather there is gradation of mixed economies each falling on this wide spectrum depending on its dominant economic structure and the share of public and private sectors in the economy.

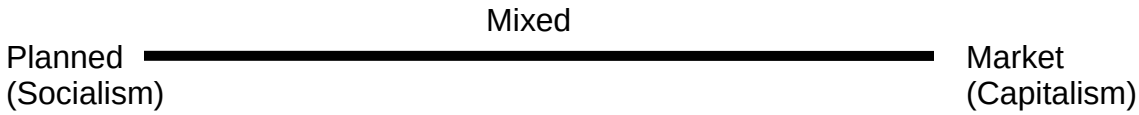

Figure 4 – Economic structure spectrum

The relative position of an ERR in this spectrum implies distinct variation in the nature of governance and quality of institutions. The relationship with other regions, national economy, and the rest of the world, the role and dominance of international or national oil companies, and whether the energy sector in an ERR remains an enclave or is integrated with other sectors of the economy varies with position on this spectrum.

Recent World Bank studies show that the share of physical (produced) capital in total wealth is constant across different country income groups but the share of natural capital tends to fall with income while the share of intangible capital rises. The study also shows much higher genuine savings (investment) rates for market economies than formerly centrally planned and other resource dependent developing countries. These findings clearly indicate that rich market economies do better with their physical capital. In other words these economies are rich because of the skills of their population and quality of institutions supporting economic activity and transforming natural capital into intangible capital. Therefore, the position of an ERR on the planned-market spectrum has a lot to say about the quality of institutions and the role of governance in exploitation of the resource and the nature of transforming these transient revenues into other forms of reproducible capital. In addition, the level of integration of the energy resource sector with other sectors and with the national economy is also largely determined by the position of the ERR on planned-market spectrum.

4. Conclusions

This paper claims no theoretical or methodological novelty, rather it provides a conceptual development framework based on the established theoretical literature and a systematic regional knowledge base as a broad context for applied quantitative and qualitative development analyses of energy rich economies at regional level. The development framework emphasizes sustainability based on constancy of total capital stock and the knowledge base builds on the extensive literature related to the multifaceted field of development in energy rich economies; and it proposes an integrated compendium of geologic, geographic, geoeconomic, and geopolitical data

and information to derive development patterns and create a broad context to study sustainable development in ERRs.

This comprehensive knowledge base of energy rich economies on a regional level provides a useful basis for studies of sustainable development with a new economic-spatial perspective. The knowledge base can be used for: i) classifying these regions using various schemes and identifying salient features of each sub-group of ERRs; ii) establishing simple stylized facts based on relationships between spatial and economic structure and the pattern of development in these economies; and iii) serving as a basis for qualitative and quantitative studies which in turn can further enrich the knowledge base.

ERRs will receive substantial investments in the form of megaprojects in the next two decades. These investments will alter capital composition in these regions and the outcome will profoundly impact development at regional, national and even global level. Case studies of ERRs with different positions on the planned-market spectrum experiencing a different stage of growth or with varying reserve size could provide invaluable insights into the development processes of these economies. Case studies and comparative analyses can facilitate exchange of experience for ERRs with varying economic structure, stage of development, and resource life. These qualitative studies can result in important policy lessons at regional, national, and global levels. The broader ERR development context suggested in this paper can be used to derive stylized facts and development pattern in ERRs. Those regions in earlier stages can learn from the extensive experience of regions that have passed – successfully or unsuccessfully – their resource dependence period.

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