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CHALLENGES OF GLOBALIZATION

**PHENOMENON OF PLENTY: THEORY
AND DIAGNOSIS**

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Key words: Phenomenon of Plenty, Dutch disease, oil, direct de-servisation, algorithm for diagnosis.

Abstract: Present study theoretically explores and empirically diagnoses the Phenomenon of Plenty - paradox of below-potential economic performance of nations generously endowed with natural resources, focusing on oil-rich CIS members: Russia, Azerbaijan, and Kazakhstan. Extending theoretical structure to proposed Four-Component Process it reports existence of direct de-servisation finding previously overlooked cause of oil paradox - downturn of non-tradable sector long-time lacking production forces. Application of elaborated 5-Sign Algorithm for Diagnosis of the Phenomenon of Plenty elicits its presence across evaluated nations.

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Introduction

Area of this study is exploration of the Phenomenon of Plenty - economic paradox of inferior performance of nations with superior natural resources. Prolific mineral deposits located on the mainland of Eurasian Continent do not bring commensurate prosperity to owners of this tremendous wealth of nature - global major petroleum producing countries of the Commonwealth of Independent States (CIS), namely Russia, Azerbaijan, and Kazakhstan. Accomplishment of this research is conducting Theoretical Investigation of the Phenomenon of Plenty aiming to improve overall state of knowledge over this subject taking into consideration contemporary economic processes and Empirical Study, elaborating Algorithm for Diagnosis of the Phenomenon of Plenty, focusing on research of target region of Eurasian Petro-Nations in order to elicit particular adverse implications for them, so creating a basis to devising a range of applicable counter-actions.

Extension of theoretical-analytical framework of the phenomenon of plenty

Literature background

Foundation pillars for current research were mounted by prior theoretical and empirical investigations concurrently with growing disenchantment in postulate of florescence prospects of naturally-rich economies embedded in paradigm of absolute or comparative advantage specialisation advocated by Adam Smith and David Ricardo spearheading classical economic school cohort. Doctrine inquiries

initially tackled new research and policy-making agenda from perspective of power imbalance of polarised by development 'core' and 'periphery' nations as articulated in Prebisch-Singer Thesis (1950). Subsequently, span of resource-caused malfunctioning over developed world rendered support to structural transformation angle of analysis - gas of the Holland section of North Sea led to 'The Dutch Disease' exposed by The Economist (1977) giving this appellation to analogous incidences throughout the world since then, whereas pivotal rigorous scientific investigation scrutinising process of structural transfiguration of resource-abundant economy and eliciting adverse mutation as a principal root of its misfortunate performance is of Forsyth and Kay (1980) empirical model testifying damage to manufacturing from oil in UK part of North Sea.

Core research serving as a basis for our theoretical work Corden and Neary (1982) devised full three-sector model of booming, lagging and nontradable sectors founding solid basement for present-day thinking about Dutch Disease, popularized term in academia, and pioneered in exhaustive in-detail phenomenon / implications study precisely outlining mechanism of de-industrialization via withdrawal by booming oil business of capital and labour resources from manufacturing as well as via allocation of increased disposable income to non-tradables and imported tradables. Essential for our research are also studies of Lynn (1997) for new vision / dimensions for the Phenomenon of Plenty, Egert and Leonard (2007) for relevant regional focus and specificities insight, and Papyrakis and Gerlagh (2007) for base of empirical study framework.

Research coverage of the Phenomenon of Plenty in the CIS petrostates - Span of existing investigations on the Phenomenon of Plenty

does not cover sufficiently emerging nations of the post-soviet bloc, though there are already some relevant works: Russia - Lane (1999) on the political economy of Russian oil; Kim (2003) on the resource curse in a post-communist regime; Russia in comparative perspective; Fetisov (2008) on the problem of reducing the dependence of the Russian economy on primary product exports and economic policy alternatives; Dobrynskaya and Turkisch (2010) on economic diversification and Dutch Disease in Russia; Treisman (2010) on oil and democracy in Russia. Azerbaijan – is investigated by international organizations functioning in the state. Kazakhstan - Burke (2009) on the effects of devaluation of the Tenge upon the Kazakhstan economy; Egert and Leonard (2008) on reality of Dutch Disease Scare in Kazakhstan; Kutan and Wyzan (2005) on explaining the Real Exchange Rate in Kazakhstan in 1996-2003 and Kazakhstan's vulnerability to the Dutch Disease.

Adjustment of core economics of the phenomenon of plenty

Quest of consummate state-of-the-art framework for analysis of the Phenomenon of Plenty has been driving this investigation to critically re-consider established approach in modern economics in order to descry its deficiencies and work out improvements. Milestones of advancement of current thinking by our research are attained by initial thorough review of 'per effect' framework, proposing our ameliorations to this original method.

FIGURE 1. PROCESS FLOW OF THE PHENOMENON OF PLENTY

Source: Author.

Timeline of essential effects of the Phenomenon of Plenty is theoretically structured for several consecutive / overlapping stages basing on existing academic studies and

practical observations of functioning of petroleum domain as well as performance of national economies across the sample nations of the CIS, i.e. Russia, Azerbaijan, and Kazakhstan. Our Process Flow is distinguished not only by proper structuring of systematised theoretical knowledge, but also by adding one new stage defined as Direct De-Servisation, making the whole chain reflect better contemporary realities and regional specifics. Captured interactions of economic processes are constitutionally aligned in **Four-Component Process** (Figure 1).

Prerequisite Condition. Emergence of a prosperous oil sector leads to re-shaping of a pattern of allocation of resources across entirety of major spheres of national production. Florescence of petroleum domain due to incidence of high-impact developments, i.e. discovery of new oil fields, quarrying's technological improvements, liberalisation of rules for subsoil resources use, or amelioration of global terms of trade, is exerting upward pressure on marginal productivities of mobile production factors, i.e. capital and labour, employed in oil business. Subsequently, there are arising opportunities of putting to better productive use capital and labour available throughout economy letting their owners to benefit from higher remuneration.

Stage 1 Factor Reallocation Effect of the Phenomenon of Plenty. Arrangement of resources across booming, tradable, and non-tradable sectors is founding on respective sectorial returns on capital and labour. Superior lucrativeness for both these factors in booming petroleum sector engenders *Factor Reallocation Effect* (FRE) incentivising proprietors of mobile production factors to abandon less-profitable activities in tradable and non-tradable spheres and shift to expanding oil area in a timely fashion to explore appeared profit-maximising opportunities.

$$MPK_B > MPK_T, MPK_N$$

$$\text{and } MPL_B > MPL_T, MPL_N$$

$$r_B > r_T, r_N \text{ and } w_B > w_T, w_N$$

Trichotomy of economic sectorial structure, adopted in this research, embraces continuous competitive arrangement of resources over: booming sector (B), tradable sector (T), and non-tradable sector (N), basing on respective sectors' returns on capital (r) and wages (w).

$$K_T, K_N \rightarrow K_B \text{ and } L_T, L_N \rightarrow L_B$$

Magnitude of FRE reflects Scale of Withdrawal of Production Resources determined by forces of exterior 'Push' and interior 'Pull' nature, mainly comprised by price of oil, investment risk, and wages.

$$\Delta FRE = f(Push, Pull) = f(p_{oil})(\delta, w)$$

FIGURE 2. FACTOR REALLOCATION EFFECT:
 DE-INDUSTRIALISATION AND DE-SERVISATION

Source: Author.

FIGURE 3. FACTOR REALLOCATION EFFECT:
 IMPACT 1 - DIRECT DE-INDUSTRIALISATION

Phase 1.1 Direct De-Industrialisation (1-st adverse impact of FRE). Centrepiece of destructive aftermath of the Phenomenon of Plenty called *Direct De-Industrialisation* – is decline of technologically intensive production caused by expansion of growing commodity sphere, where mobile factors of production, i.e. capital and labour, are hollowed out from learning-by-doing generating activities in favour of less-knowledge prolific extractive realm characterised by higher profitability at that moment. Damage to traditional tech-superior, yet now lagging tradable sphere, is principal trade-off challenging resource-abundant economies and drawback potentially capable to outweigh bonanza of oil wealth and result in a long term backwardation becoming the curse of Petro-State.

Phase 1.2 Direct De-Servisation (2-nd adverse impact of FRE). Lucrativeness of activities in expanding prosperous petroleum sphere equally attracts resources from non-tradable sector, subsequently generating another negative repercussion of the Phenomenon of Plenty named *Direct De-Servisation* – is temporary downturn of services sector consequently contributing further to long-term commodity specialisation of a nation, since mobile factors of production, i.e. capital and labour, are withdrawn for their use in minerals quarrying and at the initial stage there is no support for non-tradable demand, whereas such long persistent imbalance keeps damaging national economy.

FIGURE 4. FACTOR REALLOCATION EFFECT:
 IMPACT 2 - DIRECT DE-SERVISATION - TYPE 2

Source: Author.

Explanatory Note for Contribution: Oil-led development finally restores non-tradable domain and even boosts its growth at the phase of inflow of petroleum proceeds stimulating domestic consumption, which is why damage to services was previously neglected by scholars. We introduce Direct-Deservisation in this work as a separate occurrence because nowadays there is a significant extension of a timespan from getting / using mobile resources (labour and capital) and actually receiving proceeds from oil after completion of petroleum facilities (rigs, pipelines, other infrastructure).

Technologically-caused waiting period is due to increasing complexity of getting petroleum to the surface due to exploitation of technically more complicated oil fields which were not tried in the past; in addition, there is a financial delay because of innovative trade finance instruments stipulating deferred stream of payments for supplied minerals.

Stage 2 Spending Effect of the Phenomenon of Plenty. Co-jumping of oil revenues prorate to extent of petroleum business expansion entails accumulation of real disposable income in the country engendering *Spending Effect* (SE) - is commodity-revenue led elevation of a ratio of non-tradable to tradable prices' levels producing appreciation of domestic currency, leading to profitability enhancement for mobile production factors, i.e. capital and labour, in non-tradable realm and their subsequent re-allocation there from traditional tradable domain, so resulting in a process of Indirect De-Industrialisation

continuing until factor remuneration equalisation.

Phase 2.1 Real Exchange Rate Appreciation (1-st adverse impact of SE). Massive incoming petroleum revenues foster internal demand for all types of output, while different adjustment reactions of supply side constituents induce a destructive consequence of the Phenomenon of Plenty called *Real Exchange Rate Appreciation* – is augmentation of price of non-tradables in terms of tradables $RER = \frac{P_{NT}}{P_T}$ basing: firstly, on a mechanism of the Law of One Price, according to which international price-setting for tradables is unaffected by local income increase, and secondly, on concurrent domestic price-fixing for non-tradables dramatically pushed upward by income augmentation.

FIGURE 5. SPENDING EFFECT: IMPACT 1 - REAL EXCHANGE RATE APPRECIATION

Source: Author.

FIGURE 6. SPENDING EFFECT: IMPACT 2 - INDIRECT DEINDUSTRIALISATION

Phase 2.2 Indirect De-Industrialisation (2-nd adverse impact of SE). Expansion of non-tradable domain incurs another deleterious repercussion of the Phenomenon of Plenty called *Indirect De-Industrialisation* – is contraction of tradable manufacturing caused by removal from it of mobile factors of production, i.e. capital and labour, aspiring to higher remuneration in non-tradable domain undergoing development spurred by demand-supporting oil revenues. Therefore, moving of production frontier outward and increase of actual wellbeing of petro-nation via spending effect are coming at cost of further shrinkage of more technological traditional tradable activities.

Diagnosing presence of the phenomenon of plenty

Present research is targeting to find out with certainty whether the Phenomenon of Plenty exists in considered nations of the Commonwealth of Independent States, namely Russia, Azerbaijan, and Kazakhstan. Synthesising metrics of copious existing approaches this study designed the **Algorithm for Diagnosis of the Phenomenon of Plenty** embracing all the most appropriate criteria for revealing pathogen-signs of the 'oil malaise'. Analysis of assembled stylised facts focuses on coverage of **Pre-Conditions** and **Five Principal Signalling Indicators**, which were documented to exist for all three our investigated sample countries.

FIGURE 7. OIL PRODUCTION, RESERVES AND EXPECTED DURATION OF EXTRACTION

Source: BP Statistical Review of World Energy 2010.

Pre-conditions

Petroleum Settings of Russia - Background of oil discoveries and exploration: Global leadership of Russia in petroleum production attained by 2010, outpacing Saudi Arabia and gaining 1-st oil producer status, comes in reward for ardent exploration of vast subsoil abundant of mineral wealth. Ample hydrocarbon reserves have been discovered and intensely exploited across the following regions: Khanty-Mansiysky, Yamalo-Nenetsky, Nenetsky, Tatarstan, and Tumen. Plethora of produced petroleum going for export or domestic consumption is coming from the major oil fields as follows: Samotlor, Priobskoye, Romashkinskoye, Fedorovskoye, and Uzhno-Russkoye, as well as from an array of medium and small size fields predominantly across Siberia and East of the Russia. **Oil Reserves:** Volume of Proven Oil Reserves of Russia is approximately 74 billion barrels, whereas some experts assert that another evaluation metrics display that they even get to 80 billion barrels threshold. Duration of time-span left for oil-led development is reflected in Oil Reserves-to-Production (R/P) ratio* showing number of years of oil use left. Recent estimations of British Petroleum experts provided in "BP Statistical Review of World Energy 2010" display that basing on current amount of proven reserves and present rate of depletion there are

only 20 years remained for Russia to enjoy oil proceeds.

Petroleum Settings of Azerbaijan - Background of oil discoveries and exploration: Long-lasting history of petroleum exploration in Azerbaijan dates back to yearly seepage of oil in ancient times of Zoroastrianism in 6-th century A.C. making located on Absheron peninsula the antique city Baku, which is still the capital of modern Azerbaijan, a legendary place which served as one of the oldest mystique main centres of this religion of fire, worshiping eternally burning oil wells. Forefront of petroleum industry of Russian Empire in XIX – early XX century Baku area was the largest oil field in the world at that period producing massive for that times amount of petroleum. Taking lead in oil refining and producing kerosene in the mid XIX century this place also commenced to accumulate technological data on petroleum-based products manufacturing. **Oil Reserves:** Today, traditional role of hydrocarbon specialization of Baku is preserved – there is one of the largest oil fields of the whole Caspian Basin staying at about 100 km away from shoreline – Azeri-Chirag-Guneshli (ACG), which is being intensely exploited due to advantageous location allowing easier channelling of petroleum to the major European and other international consumers via Turkish part of Mediterranean Sea. Azerbaijan – is the largest oil nation in Caucasus with its 7 billion barrels of proven petroleum reserves, 3-d in CIS, and 20-th in the world. Future prospects, however, of oil use by Azerbaijan displayed by Oil Reserves-to-Production (R/P) ratio are demonstrating that the number of years of oil use left is at 18 level. Therefore, complete depletion petro-affluence of Azerbaijan is rather

* According to BP methodology the R/P evaluation is as follows: "Reserves-to-production (R/P) ratio - If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time".

soon if there will be exploitation at current rate and there will be no substantial discoveries.

Petroleum Settings of Kazakhstan - *Background of oil discoveries and exploration:* Leveraging geological researches initiated during socialist period led new authorities to discoveries of massive oil fields which have transformed geopolitical and economic significance of Kazakhstan. Regional stability in political, economic, and social dimensions made Kazakhstan an attractive place for doing oil business, while some law and order concerns persist. Landlocked position of the nation create certain complexities for provision of petroleum to international markets, requiring government to find reliable pathways for pipelines and serious political efforts for getting proper agreements with CIS countries and other overseas locations needed for oil transportation infrastructure. *Oil Reserves:* Huge amounts of oil in the fields of Tengiz, Kashagan and Karachaganak located in the western part of mainland Kazakhstan and in the Caspian Sea make 30-40 billion barrels of oil and comprise about 3 % of global proven petroleum reserves. Ranked 2-d in CIS and 9-th in the world by the amount of proven oil reserves Kazakhstan in addition to that has greatest in CIS and one of the highest worldwide R/P ratio at 64 years demonstrating very strategic position of the country for long-term cooperation in hydrocarbon energy resources. However, confidence about long duration of available petroleum could harm timely action to curb any repercussions of resource-based development pathway.

Algorithm for diagnosis of the phenomenon of plenty

PATHOGEN-SIGN 1 Fast-paced petrolization process backed by new oil discoveries for last two decades within 1990-2010 is indicating presence of the 1-st pathogen-sign of the Phenomenon of Plenty, which is '*Petroleum Massive Share in GDP*' due to oil proceeds' more than doubling in Russia rising from 1/10 in 90s to 1/4 today, tripling in Azerbaijan from 1/4 in 90s to 3/4 now, and doubling in Kazakhstan from 1/6 in 90s to 1/3 presently.

FIGURE 8. PETROLEUM MASSIVE SHARE IN GDP

Source: Author's calculations.

PATHOGEN-SIGN 2 Forceful upward co-movement with intensified oil exploitation of the Real Exchange Rate of domestic currency manifests availability of the 2-nd pathogen-sign of the Phenomenon of Plenty, which is '*Real Exchange Rate Appreciation*' since in 2000s RER was accelerating its rise in Russia augmenting 2 times, updating its highs for several consecutive years in Azerbaijan, and attaining higher levels in Kazakhstan.

FIGURE 9. REAL EXCHANGE RATE APPRECIATION

Source: Author's estimates basing on data of respective National Banks.

PATHOGEN-SIGN 3 Vigorous shift of mobile production resources to oil-bountiful locations signalises the 3-rd pathogen-sign of the Phenomenon of Plenty, which is the '*Factor Reallocation Effect*'. Outpacing rate vs. rest of economy for Capital: in Russia 6-fold for total foreign investment and 9-fold for FDI, in Kazakhstan and Azerbaijan it is also manifold; for Labour: in Russia 0.2% vs. -0.2%, for post drop 00s in Azerbaijan 1.3% vs. 1.1% and in Kazakhstan 1.6% vs. 0.6%.

PATHOGEN-SIGN 4 Soaring disposable income from boosted oil proceeds signals presence of the 4-th pathogen-sign of the Phenomenon of Plenty, which is the '*Spending effect*', so during two decades disposable petroleum-led income per capita went several times up - in Russia 4 times↑ from \$580 to \$1980 per capita, in Azerbaijan 11 times↑ from \$291 to \$3187, and in Kazakhstan 12 times↑ from \$200 to \$2422.

FIGURE 10. INCOME RISE FOR
SPENDING EFFECT

Source: Author's estimates basing on national statistics.

PATHOGEN-SIGN 5 Re-split of oil to skyrocketing exports and falling 'in-house' use point to presence of the 5-th pathogen-sign of the Phenomenon of Plenty, which is 'Economy's Structure Change - Fall of Non-Booming Part'. Domestic oil intake shrank 1.6-2.3 times since

1990, lowering in Russia by 1.6 from 5.1 to 3.1, in Azerbaijan 2.3 times from 0.17 to 0.07, and in Kazakhstan 1.7 times from 0.44 to 0.26, mbpd, with exports rise 1/3, 11.4 and 14.6 times accordingly.

FIGURE 11. ECONOMY'S STRUCTURE CHANGE

Source: Author's calculations basing on BP Statistical Review of World Energy 2010.

Conclusions and policy implications

Incorporating contemporary realities and regional peculiarities into the Theoretical Model of the Phenomenon of Plenty ameliorated applicability of such analytical framework for modelling oil-driven development of the sample members of the Commonwealth of Independent States, namely Russia, Azerbaijan, and Kazakhstan. Presence of elicited Direct-Deservisation Phase is supposed to re-shape both content and timeline of policy response of incumbent politicians. Addressing decline of a non-tradable sector is a new agenda challenging hydrocarbon producers, previously solely preoccupied with deterioration of traditional tradable realm. Therefore, contemporary conditions add Deservisation to Deindustrialisation, hence doubling concerns of oil-nations having now to evaluate extra adverse trade-offs of oil-led development pathway scenario. If, Deservisation persists and gets longer it could cut engagement of certain oil-producers in petroleum-related activities in the future.

Formulated Algorithm for Diagnosis of the Phenomenon of Plenty relying on examination of Pre-Conditions and assessment of Five Principal Signalling Indicators has corroborated presence of the 'Oil Paradox' in all three considered CIS states - Russia, Azerbaijan, and Kazakhstan. Designed technique is applicable for determining strength of the impact of oil abundance on particular dimensions of domestic economy's functioning, so prompting scale and character of countermeasures.

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