University of Piraeus
ΣΠΟΥΔΑΙ / SPOUDAI
Journal of Economics and Business
http://spoudai.org

Dutch Disease in Eastern Mediterranean – A Theoretical Hypothesis

Grigoris Zarotiadis[a], Odysseas Kopsidas[b], Dimitra Giannopoulou[c]

[a]*Dr. Prof., School of Economics, Aristotle University of Thessaloniki, Greece*
Email: gzarotia@econ.auth.gr
[b]*Post-Doc Researcher, School of Economics, Aristotle University of Thessaloniki, Greece*
Email: odykopsi@yahoo.gr
[c]*PhD Candidate, School of Economics, Aristotle University of Thessaloniki, Greece*
Email: dgiannopou@gmail.com

Abstract

Standard Dutch Disease is simply a case of difficult, longer lasting and therefore risky process of adjustment towards a new, favorable macroeconomic outcome. In this paper we present a modified version, where the scenario is more severe: additional to the induced inter-industry changes, the new general equilibrium itself could be worsened, as the sudden booming of a specific economic activity (especially in the extraction industry) causes permanent opportunity costs and externalities that adversely affect the production possibilities in other sectors. After reviewing standard theoretical literature and the part that focuses on the specificities of low-income economies, in the fourth section we conceptualize this hypothesis on the potential exploitation of Eastern Mediterranean hydrocarbons reserves. 'Dealing' and 'cleaning' costs generate a political and an environmental crowding out and thereby a worsening of the Production Possibilities Frontier, next to the existing, potential benefits from the discovered resources. We argue that the final outcome depends on the special characteristics of each region being decisive for the severity of the permanent harm to other industries, as well as on the degree of openness of domestic economy and the biasness of consumers' preferences. The conclusions from the discussion of the specific hypothesis can be useful for a more accurate cost-benefit analysis of expansion in the extraction industry.

JEL Classification: Q34, Q35, Q43
Key-words: Dutch Disease, 'Dealing' & 'Cleaning' Extraction Costs, Blue Economy, Mediterranean.

1. Introduction

Discovering new resources unquestionably generates investment possibilities and strengthens exports, has positive spillovers for other local activities, boosts potentially domestic income and well-being of the people in the region (Alssadek & Benhin, 2021).

However, economists realized in the 1960s that the opposite may be also true: in 1959 natural gas deposits have been discovered in the Netherlands, in the North Sea (Slochteren gas fields). The induced attraction of foreign capital and the export boom that followed – the country quickly became a net exporter of natural gas and experienced a huge increase in relevant revenues – enhanced exchange rate of the Dutch Guilder offsetting thereby

competitiveness of other domestic sectors that used to be important for national economy before hydrocarbons reserves have been ascertained. The appreciation of the national currency, as well as the fall of capital investment in other sectors and the substitution of jobs by vacancies in the extraction industry induced a decline in manufacturing (in 1964 the Netherlands had a 25% reduction in manufacturing jobs) and a substantial increase in unemployment for the whole economy, from 1,1% to 5,1% (Chen, 2021) signifying difficulties at least in the medium run during the necessary inter-industry adjustments.

Overall, the 'Dutch Disease' scenario refers to the difficulties arising in the period where the economy adjusts towards a new, favorable equilibrium, following an exogenously induced boost in an export-oriented industry. It is majorly a matter of interindustry adjustments that may take time and provoke substantial socioeconomic burdens. The case in the Netherlands has been studied in various contexts worldwide (Corden & Neary, 1982). Sachs and Warner (1995) went also a step further, as they argued that "one of the surprising features of modern economic growth is that economies with abundant natural resources have tended to grow less rapidly than natural-resource-scarce economies".

In recent decades, the Eastern Mediterranean has seen a surge in offshore natural gas discoveries, igniting discussions on the potential for economic transformation, but also concerns over Dutch Disease (Apergis and Payne, 2014; Bahgat, 2019). Countries in this region lack economic diversification making them more susceptible to the adverse effects of resource booms (Ioannides, 2019). Even more, the region is distinct in its geopolitical, economic, and historical contexts, which can influence how Dutch Disease manifests.

In the present paper we argue that in special circumstances 'Dutch Disease' can become a more severe phenomenon, as the emerging opportunity costs may even harm the economic prospects in the long run as well! We proceed first with a brief description of the standard version of the theoretical model that relies upon the discussion of the Dutch case itself. Next, we review several other incidences worldwide that reproduce the same problematic, focusing especially on cases of developing and less-developed economies. The fourth section is the main part of the paper, where we develop a significantly modified version of the model based upon the theoretical hypothesis on the special characteristics in the Mediterranean. Last, we conclude on policy implications and proposals for further research.

2. The Core Model

The term Dutch Disease (DD) firstly occurred in a 1977 paper published on the 26th of November in The Economist suggesting that the extreme focus on a newly arising sector (Reisinezhad, 2020) could eventually lead to the degradation of that country's economic performance and growth, at least in the medium run, as the economy shifts away from the previous macroeconomic equilibrium (Behzadan et al. 2017).

The literature recognized several adverse effects for the functioning and the structure of the domestic economy. Slowing down average labor productivity is one of them, as physical and human capital investments shift away from industries where they could potentially bring in more intense and significant innovations in terms of product and process development.

Interindustry mobility of productions factors generates also strong and "costly" (in a broader sense) demographic and spatial transformations: shifts of labor force in new areas of agglomeration, deepening regional disparities and/or between urban and rural areas, provoking new dimensions of inequalities etc. (Mien & Goujon, 2021). Adjusting to the new spatial and sectoral structure may take a lot of time and induce severe sacrifices.

There are two additional arguments that explain the possible deterioration in the balance of payments, even though the new, extremely fast-growing sector is (most of the time) an exporting one. The exploitation of the newly discovered resource generates income-surpluses for new beneficiaries, who change their preferences and lifestyle to use luxury items, predominantly being imported. At the same time, the rising volume of exports in the resource related industry and the attraction of foreign investments in the same sector provoke significant pressures to the exchange rate of the national currency to increase; an appreciation, which, as it is not related to any real gains in the terms of trade (e.g. gains in total factor's productivity or an exogenous strengthening in global attractiveness for local production), results in a severe deterioration for other industries' international competitiveness.

In order to analyze the above in a combinatory, general equilibrium framework, Corden and Neary (1982) used the so-called Australian model (Salter,1959 and Swan, 1960 and 1963) that is based upon the differentiation of two sectors in the economy: the sector of 'tradable' (signified with ***T*** in the following diagram) and the one of 'non-tradable' commodities (***N*** in the diagram), meaning that they cannot be subject of exports and/or imports, or, in order to be more accurate, that in this sector international trade faces strong natural and/or institutional barriers keeping exports and imports relative low compared to the volume of the specific markets. In other words, ***T*** is the 'open' and ***N*** the quasi 'closed', autarkic part of the national economy.

In diagram 1 we reproduce the standard analysis. After the exogenous increase in the abundance of a tradable resource, production possibilities frontier (PPF) grows from the blue into the red one. Given the (grey) indifference curves representing consumers' preferences, the new macroeconomic equilibrium is ***E'*** and, as expected, the welfare level of the whole economy will rise and relative prices $\boldsymbol{P_T\, e/P_N}$ (shown in the slope of the common tangent in the equilibrium points) will fall[1], which means that domestic economy will experience a real appreciation of its terms of trade.

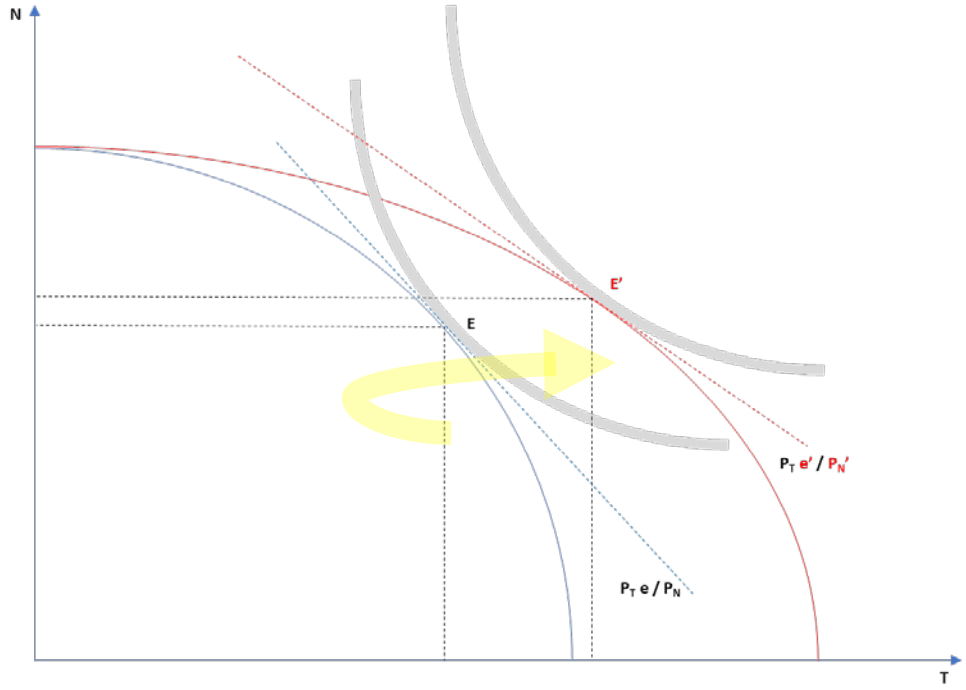
Nevertheless, reaching the new equilibrium is not an immediate procedure – it involves several, time consuming, troubling and costly adjustments. In the relevant literature all the above-mentioned adverse consequences have been conceptualized in the following two categories:

(1) The 'resource movement effect', also called 'direct deindustrialization', refers to the interindustry substitution within the open, tradable sector of the economy: away from industries that used to contribute more or less significantly towards the booming sector related to the new resource. Being the attraction of production factors or the consequence from the induced appreciation of domestic currency (see above), resource-based activities take the place of traditional manufacturing and agricultural productions (Corden, 1984).

(2) The 'spending effect' ('indirect deindustrialization') indicates on the other hand a substitution among the sectors: the extra revenues brought in by the resource boom change the patterns of consumers' behavior and induce a shift of aggregate demand to the non-tradable sector (consisting majorly of services). The amplified demand for non-traded goods increases their prices $\boldsymbol{P_N}$ (recall the relevant discussion above).

[1] Note that $\boldsymbol{P_T}$ stands for the international price level of internationally traded commodities (recall that we are dealing here with open, relatively small, domestic markets) multiplied by ***e***, the nominal exchange rate of domestic currency, while $\boldsymbol{P_N}$ represents domestic prices for the non-traded goods and services.

Diagram 1: Standard DD Case in the Australian Model



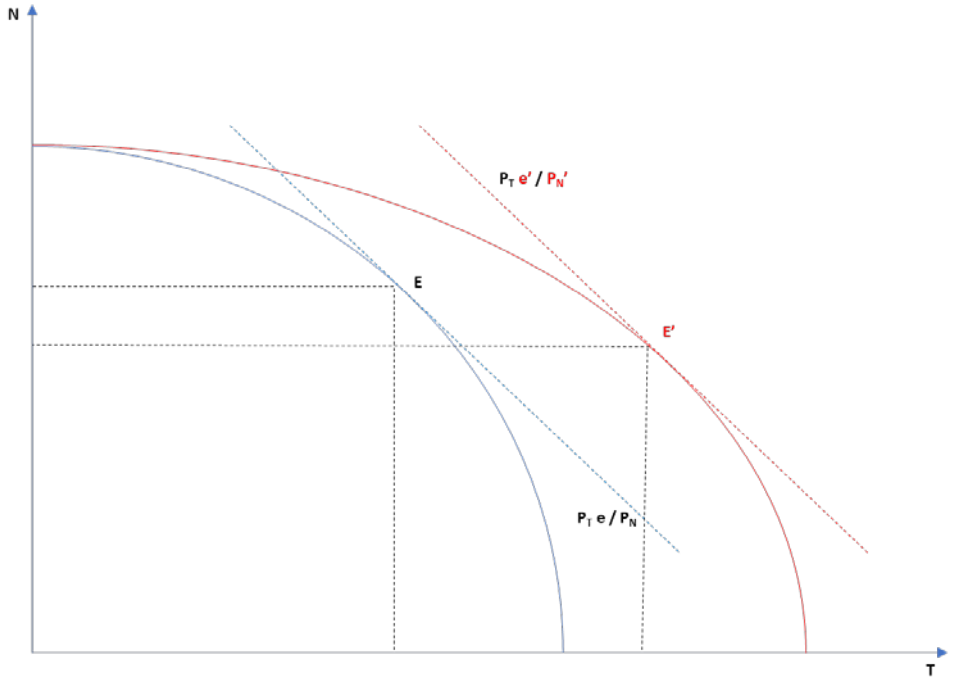
In terms of the diagram, the way towards the new, favorable macroeconomic equilibrium may involve a longer lasting, depressive adjustment period, in a way like the yellow shadowed path shows.

2.1 How consumers' preferences modify the effects

The standard analysis can be noticeably enriched, if we consider the importance of consumers' preferences for the final equilibrium and, thereby, the induced adjustments in the medium run. Suppose for instance that aggregate demand is biased towards tradables (indifference curves would be turned towards the horizontal axis). This case is presented in diagram 2: 'spending effect' will not occur, as, because consumers prefer tradables, the extra revenues will cause demand in the open rather than the closed sector of the economy. This will counteract the "resource movement effect" and preserve (or even boost if biasness of preferences will be strong enough) also the other industries in the sector where the resource boom occurs. In terms of prices, $\boldsymbol{P_N}$ will fall and thereby (partly or fully) offset the induced appreciation of domestic currency. Real exchange rate (another way of anticipating the ratio of prices $\boldsymbol{P_T\, e/P_N}$) could even rise (real devaluation), or at least the induced decrease will be modest compared to the previous case where 'spending effect" is present.[2]

[2] In diagram 2, for simplicity, we present the special case where the fall of $\boldsymbol{P_N}$ just counterweighs the fall of $\boldsymbol{e}$ (nominal appreciation), so that real exchange rate (the slope of the common tangents) remains the same.

Diagram 2: The significance of consumer preferences



In case of preferences being biased towards tradables, the main problem that the economy has to face during the adjustment period towards the new equilibrium (***E'***) is the intersectoral mobility of resources from ***N***- to ***T***-sector rather than (direct or indirect) deindustrialization. The situation changes if we think of the opposite, namely a stronger bias towards non-tradable commodities (indifference curves turned to the vertical axis). Here, the 'spending effect' would be even stronger – in fact it could be so strong that in the new equilibrium the level of production in the open sector will be less, meaning a much stronger overall deindustrialization effect.

Still, regardless of the outcome according to the type of consumers' preferences, DD is simply a case of difficult, longer lasting and therefore risky process of adjustment towards the new, favorable macroeconomic equilibrium that can be reached because of the fortune to have new resources being discovered. As we will see in the next section of the present contribution, this may become even more severe if we accept the hypotheses derived out of the special characteristics of regions like the Eastern Mediterranean.

3. A Review of DD Cases

Since the late 1970s when the concept was first introduced, several other extreme "monocultures" have been recognized around the world in the years that followed, as well as in reviews of historical economic incidences. In most cases we deal with countries that heavily rely on exporting natural resources. The booming sector is usually the extraction of oil, natural gas, gold, copper, diamonds or bauxite, or the production of crops, such as coffee and cocoa, or even tourism. Nevertheless, the same approach can be adopted in all situations, where a very explicit, exogenous, industry related advantage occurs that unexpectedly and, more important, significantly enough increases international competitiveness yet only of the specific industry leading to unbalanced, extreme specialization of domestic production factors.

In the present section of the paper, before we proceed with the main part of our hypothesis and the subsequent theoretical analysis for Eastern Mediterranean, we review how DD emerged, especially in the developing and less developed countries.

In modern economic history similar to DD cases appeared majorly in two ways: first, following the discovery of a large, easy-to-exploit source of hydrocarbons. This is typical for many developing late oil-exporting economies such as Nigeria and Indonesia. Second, as the follow up of a sudden increase in the price of oil globally, such as what occurred in the 1970s due to the low-supply strategy of OPEC countries. European oil-exporting economies – e.g. Norway, Netherlands (again) and Great Britain – found it more profitable to exploit their oil and natural gas reserves, leading them to the onset of DD symptoms – appreciation of domestic currencies and contraction of traditional export branches (Chen, 2021). The 2000s and 2010s have seen big changes in international prices of natural resources and a multiplication of mineral and oil discoveries, which made the need to understand the impact of natural resources on new arising resource-rich economies even more acute (Gasmi and Laourari, 2017).

Even if there is a large literature on the incidences in the developed economies, DD appears to be more prevalent in developing countries. This is explained by the fact that natural resources represent a higher share of total revenues in this part of the world, while they often lack political or economic institutions that can effectively prevent the adverse effects in the medium run. Moreover, in the 1990s, additional reasons were studied that may have activated DD-type incidences in this group of economies, for instance, international aid itself, migrants' remittances, or a boost in tourism activities (Mien and Goujon, 2021).

All these triggered the interest for low-income countries even more, revealing important specificities that separate them from the standard discussion for the developed economies. For example, the assumption that we start from a macroeconomic equilibrium on the PPF does not apply for countries suffering from high structural unemployment and inefficient use of existing production factors (Nkusu, 2004). Corden (1984) underlines another differentiation from the typical case: in most of the less developed economies the tradable sector is extensively based on agricultural products. Therefore, DD could result in 'de-agriculturalization' rather than 'de-industrialization'. Moreover, part of agriculture (subsistence agriculture) and the industrial activities (construction) is principally non-tradable and could even benefit, yet only if domestic consumer preferences are not biased in the opposite direction (recall the relevant discussion in the previous section).

In line with the above, developing and less-developed countries may experience quite differently the two conceptualized consequences of the DD, namely the "resource-movement" and the "spending effect". Starting with the first, recall shortly the standard argument: the booming branch absorbs a continuously bigger share of the national supply of production factors squeezing thereby the other industries in the sector of tradables (Neary and Van Wijnbergen, 1986). Besides, even if this is not necessarily the case – many authors have argued that extraction businesses do not involve so much labor[3] - still a tendency for wages to raise results out of either the higher marginal product of factors in the booming sector (Fardmanesh 1991, p. 712), or the indirect influence on centralized wage negotiations. As productivity gains do not appear horizontally in the whole sector of tradables, direct de-industrialization may still be induced, since manufacturers would be unable to pay the higher prices for production factors (Nyatepe-Coo, 1994, p. 329).

[3] Hutchison (1994) and Kremers (1986) provide relevant empirical evidence when they show the low labor intensity of hydrocarbons extraction in Norway and the Netherlands.

The situation can be completely different in less developed and developing economies, simply because there are substantially unemployed resources: the booming sector could draw upon these unutilized factors of production to facilitate its expansion, rather than substituting other manufacturing and agricultural activities. In low-income countries the resource-movement effect could in fact be minimized or even eliminated.

Moving on to the 'spending effect', here the problem is that the increase in domestic income due to the booming industry (whichever the 'monoculture' will be) provokes an intersectoral movement towards the closed sector of non-tradables for two reasons: because as income rises various services get to be more preferred by domestic consumers and/or due to the fact that only domestic prices (namely $\boldsymbol{P_N}$) will rise, as $\boldsymbol{P_T}$ result out of global demand and supply (Neary and Van Wijnbergen, 1986). Yet this presupposes that the domestic economy is not big enough and does not significantly affect price-setting in the global markets. Apparently, there are also "big" developed countries. Nevertheless, as the size of an economy refers to GDP, mostly low-income countries are insignificant with respect to global aggregate demand (Rudd, 1996).

Summing up the above, opposite to 'resource movement effect', 'indirect deindustrialization' ('spending effect') is more likely to appear in developing and less-developed economies.[4] Nevertheless, whatever the revealed specificities for low-income countries and/or other special cases may be, this does not alter the fact that standard DD remains a problem of adjustment toward the unquestionably favorable, new general equilibrium benefiting from the exceptional exogenous boost.

4. Dutch Disease ala Mediterranean

The starting point of the present paper was that discovering new resources is unquestionably a good fortune. Is it really and is it always? Discussing the standard version of the DD showed that even if it is, the economy's adjustment to the new favorable conditions may take time and generate hardly to deal with socioeconomic burdens. Yet, this is not the only thinkable problem. Any economic activity, especially when this is booming in a sudden and rather not sufficiently pre-evaluated way, can induce severe opportunity costs and externalities, so that the final macroeconomic outcome could have a negative sign!

As we saw, DD repeatedly appeared in different cases worldwide. Therefore, whenever there are circumstances of a possible, exogenously induced boom in a specific extroverted industry, especially when this has to do with extraction of natural resources, relevant concerns emerge in the academic and journalistic community. This is also the case for the possibility of exploiting the existing reserves in Eastern Mediterranean. According to Ellinas, Roberts and Tzimitras (2016), hydrocarbon resources in that area have been at the forefront of energy agenda since the beginning of the 2010s. If we estimate the significance of the reserves in comparison to the needs of the surrounding economies, alone Cyprus and Israel can produce approximately 25 billion cubic meters (bcm) annually for twenty years, enough to cover one-sixth of previous Russian supplies to Europe.

[4] Still, there are also arguments for the opposite: Nkusu (2004) claims that if we consider a subsector classification for the tradables, namely the one between 'importables' and 'exportables', 'indirect deindustrialization' works through the first. However, if we accept the hypothesis that in low-income countries there is imperfect substitutability between domestically produced manufactured goods and imported ones, the respective risk is mitigated. Domestic manufacturers will be also able to raise prices as a response to the induced strengthening of domestic aggregate demand, which then allows 'spending effect' to result only due to the changes in domestic consumers' preferences.

Nevertheless, the same analysts argue that "*Eastern Mediterranean is a volatile region fraught with complex geopolitics*" (page 8 in the mentioned report). This is in fact the first major specificity that differentiates this area from the relatively 'calm waters' of the North Sea. Determining the "Exclusive Economic Zone" for each country and clarifying who has the right for the exploitation of the specific reserves is not an easy job. Moreover, even in case of succeeding in having a multilateral settlement in the region, recent political experience has proven that in similar circumstances expansion of extraction correlates with political, even military confrontations and disturbances (Toprani, 2021). This in turn affects heavily the costs and thereby competitiveness and activity in other important sectors like tourism (Neumayer, 2004), but also shipping and transportation. Saul reported that insurance costs for ships sailing through the Middle East have increased by at least 10% (!) after attacks on only two tankers in the Gulf of Oman in the middle of June 2019 (https://www.reuters.com/article/mideast-attacks-insurance-idUSL8N23L2ND). Kiss, Jacobs and Soone (2022) studied for the European Parliament the implications for transport resulting from the war in Ukraine, while Stergiou (2020) argues on maritime boundaries, regional tensions, and resource ownership disputes, particularly between Cyprus, Turkey, and Greece. We include all the above in the term '***dealing costs***', which indicates the severe consequences for other economic, welfare producing activities resulting from (geo-) political disturbances induced by the development of the resources extraction industry. Notice that thereby we mean not only temporary costs; on the contrary, we refer to induced lasting costs that affect the production capability of other sectors permanently.

Politically understood, 'warmness' is not the only element that differentiates the Mediterranean from the North Sea and other areas. Moreover, it is a semi-enclosed sea with a very delicate, fragile ecological balance. Miller et al. (2021) argue that "the full environmental impacts … are difficult to predict but are expected to be highly damaging, both within, and perhaps well beyond, the areas mined". Given the special characteristics of the region, this is especially the case in the Mediterranean (Benedetti, 2020). We refer to these effects as '***cleaning costs***' that, analogue to the above category, denote the ecological implications that adversely modify production capability in industries like fishery, tourism and other coastal activities that require the maintenance of environmental sustainability.[5]

In other words, 'dealing' and 'cleaning costs' generate a kind of a political and environmental crowding out: they signify the permanent opportunity costs of extraction industry that worsen the prospects of other industries in both, the open and the closed sector of domestic economy. In the Mediterranean this may be even more the case. First, as we saw, its special political and geological characteristics strengthen the severity of these effects compared for instance to the North Sea. Moreover, the significance of 'dealing' and 'cleaning' costs is stimulated simply because of the already high degree of specialization in the affected industries: Mediterranean coasts are home to more than 150 million inhabitants, a figure which doubles during the tourist season, as well as to more than 450 ports and terminals that account for approximately 30% of global sea-borne trade. Mediterranean blue economy consisting of sea related tourism and transportation, fisheries and coastal activities, sea-related R&D and 'clean' energy constitutes the 5th (in volume) economy of Europe and comprises one fifth of global blue economy output!

In accordance with the above, the present analysis argues for a hypothesis that the problem with "monocultures", especially in the extraction industry, is not only a matter of dealing with

[5] Georgiou (2018) argue specifically for the possible adverse effects for local tourism and services industry and Razin & Sadka (2020) as well as Abdel-Khalek (2019) focused on Israeli and Egyptian (respectively) challenges in maintaining manufacturing competitiveness, mainly due to domestic currency appreciation.

the caused, necessary inter-industry adjustments; it may also induce worsening in the general equilibrium as well. Let us be a bit more precise with this matter, having in mind the specific examples provided above: what we mean is not simply the standard arguments explaining why direct or indirect deindustrialization occurs in the medium run as the economy moves towards a favorable new reality; we rather discuss cases where the booming industry causes severe effects that lower production capability itself for the rest of welfare creating activities.

4.1 Opportunity costs in the open sector

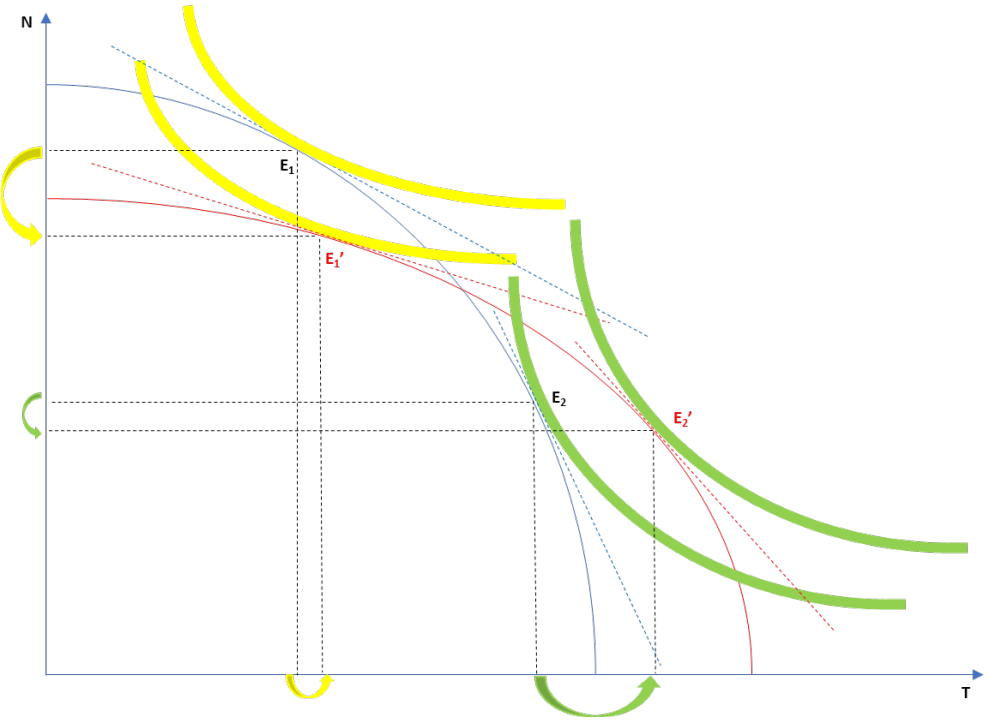
Following the Australian model that has been used to analyze the standard DD, this can be introduced in two different ways: first, with opportunity costs that affect the other branches in the open sector of tradable goods and second, a crowding out of the closed sector of non-tradable commodities.

Depicturing the first is relatively easy: in terms of diagram 1, as permanent worsening in capability for production in the rest 'open' industries offsets the gains from the positive, exogenous shock in a very specific, extroverted activity, the change in the PPF will be a modest one, or even worse, it could be completely reversed meaning that the new, red PPF is within the previous one and the new crossing point in the horizontal axis will be located left to the previous. 'Resource movement' and 'spending' effects may still be valid, but the whole burden of adjustment will now be for nothing.

4.2 Opportunity costs in the closed sector with biasness for tradables

The picture is interestingly different when we consider the second scenario, where opportunity costs – 'dealing' and 'cleaning costs' – occur in the closed sector of domestic economy. Diagram 3 shows this, as the new (red) PPF has better production possibilities for the tradables but worse for the non-tradable commodities. Here we can have two possible outcomes, depending on the form of consumer preferences: if domestic society has a stronger inclination for the tradable products (green indifference curves), the new general equilibrium will be indeed an improved one – consider the $\boldsymbol{E_2'}$ compared to $\boldsymbol{E_2}$. The "symptoms' appearing are not much different than the above analyzed, analogue standard case (compare diagram 2): after absorbing any direct deindustrialization process ('spending effect' will not occur), in terms of prices, $\boldsymbol{P_N}$ will fall and thereby (partly or fully) offset the induced appreciation of domestic currency. The fall in the price ratio $\boldsymbol{P_T\ e/P_N}$ (if there will be any) will be modest and the degree of openness will be enhanced despite the nominal appreciation.

Diagram 3: DD in the presence of severe opportunity costs in the 'closed' sector of the economy



4.3 Opportunity costs in the closed sector with biasness for non-tradables

The situation will be different If preferences are biased towards non-tradable goods (yellow indifference curves): new general equilibrium ***E₁'*** is for sure unfavorable compared to the previous, pre-booming one (***E₁***). Also here, non-tradable production will be substituted by tradable, yet in a much more severe way! At first sight, this seems to be illogical given that we discuss the case where consumers have a stronger preference for the products of ***N***-sector. A closer look, however, convinces us of the economic reasoning behind this argument: exactly because of the specific inclination of domestic demand, in the initial equilibrium (***E₁***) the decomposition of production factors is highly concentrated in the ***N***-sector. Therefore, the marginal rate of transformation ***N*** into ***T*** is much higher in this part of the PPF and thereby, the production factors being released (due to the caused opportunity costs) from the sector of non-tradables have a much weaker contribution in the production of tradables! (Compare the pair of yellow arrows with the green ones indicating the intersectoral adjustment towards the new equilibrium.)

Following, the adjustment procedure is the same, yet, only with respect to the direct deindustrialization inside the open sector: either because the booming sector attracts more production factors, or because of the induced nominal appreciation (fall of ***e***). However, with respect to the intersectoral changes, the picture will be quite different: starting from an initial general equilibrium (***E₁***), which, due to the biasness for non-tradables, has an exceptionally strong closed sector, the induced negative opportunity costs will cause a fall in production of ***N***, having finally a net negative effect on the overall produced welfare (***E₁'***). P_N will rise, this time not because of an increased demand but due to harmed production possibilities. The released production factors will move to the open sector (which in a sense indicates an indirect industrialization process, in other words the opposite than the 'spending effect'), but this will not be enough for compensating the overall losses in welfare. In brief, even here

there is specific intersectoral and interindustry adjustment, yet this time this will be towards a worsened, new general equilibrium.

Putting this together, when the opportunity costs arise in the 'closed' sector of the economy, in the new equilibrium real exchange rate will appreciate and ***T***-sector will substitute ***N***-sector. If the new equilibrium will mean a worsening or not, depends on (i) the severity of opportunity costs and (ii) the biasness of consumers' preferences. With respect to the second, it is noteworthy that there is a hidden meaning as well, as this has to do also with the way how domestic economy is structured and the decomposition of industries among the 'closed' and the 'open' sector of the economy. In other words, the worsening from E_1 to E_1' arises if in the specific country, due to domestic socioeconomic and institutional conditions, the closed sector of the economy includes goods and services that are important for domestic demand and not because of a special inclination of local consumers.

In conclusion, political and environmental crowding out can appear in two ways (simultaneously): once as a worsening of production possibilities in ***N***-sector and also in ***T***-sector as well. In terms of our diagram, these may occur as a lowering of PPF crossing point in the vertical axis and, respectively, as a more modest increase of the analogue crossing point in the horizontal axis representing the production possibilities in the open sector[6]. Thereby, besides the burden of a longer lasting period of adjustment (standard DD), in areas that share analogue characteristics to the (Eastern) Mediterranean (i) intensity of 'dealing' and 'cleaning' costs could be so strong that the final macroeconomic equilibrium would mean a worsening rather than an improvement. For this severe scenario to come true there are two additional crucial reasons: (ii) the degree of openness and the specific content of the closed ***N***-sector, as well as (iii) biasness of local consumers' preferences. Summing up, **the more severe the crowding out will be (in both sectors), but also the less open an economy is (bigger sector of non-tradables) and, finally, the more preferable (or indispensable) the non-tradable commodities are, the more likely it is that extraction boom besides causing adjustment difficulties, will harm the prospects of development in the long run as well.**

5. Conclusions and Proposals for Further Research

After reviewing standard theoretical literature focusing on Dutch Disease and the part that gives emphasis to the specificities of low-income economies, in this paper we first revealed the importance of consumer's preference in the core model and thereafter we presented a modified version of it, where the scenario is more adverse: additional to the induced inter-industry changes, the new general equilibrium itself could be worsen, as the sudden booming of a specific activity (especially in extraction industry) causes permanent opportunity costs and externalities that adversely affect the production possibilities in other sectors.

To conceptualize this hypothesis, we started by reviewing the specificities arising in developing and less-developed countries and then we proceeded with the special case of the potential exploitation of hydrocarbons' reserves in Eastern Mediterranean. Thereby, we determined 'dealing' and 'cleaning' costs that generate a political and an environmental crowding out (respectively) and thereby a worsening of the Production Possibilities Frontier, next to the existing, potential benefits from the discovered resources. This brings about the risk of a deterioration in the prospects of economic development in the long run as well (future theoretical contributions for a thorough mathematical backing of this will be needed).

[6] As we mentioned above, the possibility of having extremely severe effects on other tradables that fully offset the gains in the booming industry speaks for having a new red PPF that crosses the horizontal axis even left compared to the previous situation.

For this to occur, crucial are the special characteristics of each region being decisive for the severity of permanent harm to other industries, as well as the degree of openness of domestic economy and the preferability for non-tradable goods and services.

If we add also the theoretical suggestion analyzed above, exploitation of hydrocarbons' reserves should be carefully evaluated in the frame of a thorough, inclusive cost-benefit analysis. This is especially the case in Eastern Mediterranean, given that (i) these waters are less 'calm', (ii) this is a semi-enclosed sea with a very delicate, fragile ecological balance, where (iii) other industries, which may be affected adversely by the extraction, are exceptionally important. Therefore, the answer to the dilemma 'to drill or not to drill' has to be considered with full awareness of all thinkable aspects.

The additional arguments we presented systematically in the above can help in this direction. We have to conclude with an appeal for a better, thorough cost-benefit evaluation of the prospect to exploit hydrocarbon reserves in the specific area – besides to the costs of adjustments, all different types of 'dealing' and 'cleaning costs' should be also measured and included.

Next to the thorough evaluation and in relation to this, progressive, daring policy measures need to be applied in case the answer to the pre-mentioned dilemma would be 'to drill'. For instance, an application of the Norwegian model of a state`s hydrocarbon resources successful governance modified in the frame of an inter-state collaboration of the countries in Eastern Mediterranean, although very difficult to imagine under the present circumstances, is rather a political prerequisite. Moreover, national strategies for sectoral economic diversification and financing of related supporting policies should be coordinated and applied. Last but not least, the exceptional importance of Mediterranean 'blue economy' speaks for the necessity to apply the latest cutting-edge technology that secures as much as possible the avoidance of any environmental impacts regardless of the occurring costs of extraction.

Disclaimer

Previous versions of the present paper have been presented in: ASECU 15th and 18th International Conference, Sofia (2019) and Korca (2022) respectively, (ii) in the 15th South Russian Logistics Forum, Rostov on Don (2019) and (iii) in the International Symposium for Sustainable Solutions at Times of Transition, Nisyros (2022).

References

Abdel-Khalek G. (2019), "The Egyptian Economy: Current Challenges and Future Prospects", American University in Cairo Press.

Alssadek M. and Benhin J. (2021), "Oil boom, exchange rate and sectoral output: An empirical analysis of Dutch disease in oil-rich countries", Resources Policy, 74, p.102362.

Apergis N. and Payne J. E. (2014), "The oil curse, institutional quality, and growth in MENA countries", Energy Economics, 41, 136-141.

Bahgat G. (2019) "Energy Security: Global Politics, and the Eastern Mediterranean", Journal of Energy Security, 15(2), 10-25.

Benedetti M.S. (2020), "Offshore Oil and Gas Drilling Environmental and Economic Effects in the Eastern Mediterranean Sea", Fletcher MALD Capstone project, Tuffts University, https://sites.tufts.edu/farescenter/files/2021/01/Offshore-Oil-And-Gas-Drilling-Environmental-And-Economic-Effects-In-The-Eastern-Mediterranean-Sea.pdf

Behzadan N., Chisik R. Onder H. and Battaile B. (2017), “Does inequality drive the Dutch disease? Theory and evidence”, Journal of International Economics, Volume 106, Pages 104-118, https://doi.org/10.1016/j.jinteco.2017.02.003.

Chen J. (2021) “What is the Dutch disease?” Investopedia, (Accessed: November 16, 2022) https://www.investopedia.com/terms/d/dutchdisease.asp.

Corden W.M. (1984), "Booming Sector and Dutch Disease Economics: Survey and Consolidation". Oxford Economic Papers. 36 (3): 362. doi:10.1093/oxfordjournals.oep.a041643

Corden W.M and Neary J.P. (1982), "Booming Sector and De-industrialisation in a Small Open Economy", *The Economic Journal*. **92** (December): 825–48. doi:10.2307/2232670

Ellinas C., Roberts J. and Tzimitras H. (2016), “Hydrocarbon Developments in the Eastern Mediterranean - The Case for Pragmatism”, Global Energy Center Atlantic Council, Dinu Patriciu Eurasia Center, https://css.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/resources/docs/Atlantic%20Council-Hydrocarbon%20Developments%20in%20the%20Eastern_Mediterranean.pdf

Hutchison M.M. (1994), “Manufacturing Sector Resiliency to Energy Booms: Empirical Evidence from Norway, the Netherlands, and the United Kingdom”, Oxford Economic Papers – New Series, Vol. 46, No. 2, p. 315.

Fardmanesh M. (1991), “Dutch disease economics and oil syndrome: An empirical study”, World Development, Volume 19, Issue 6, pp. 711-717.

Gasmi F. and Laourari I. (2017), “Has Algeria Suffered from the Dutch Disease? Evidence from 1960-2016 Data”, Revue d'économie politique, (Vol. 127), p. 1029-1058. DOI : 10.3917/redp.276.1029. URL: https://www.cairn.info/revue-d-economie-politique-2017-6-page-1029.htm

Georgiou M. (2018), “The impact of natural gas exploitation on the Cypriot economy”, Cyprus Review, 30(1), 45-65.

Ioannides D. (2019), “Challenges of natural resource discovery: Cyprus as a case study”, Mediterranean Quarterly, 30(3), 21-40.

Kiss M., Jacobs K. and Soone J. (2022), “Russia's war on Ukraine: Implications for transport”, EPRS – European Parliamentary Research Service, PE 733.536

Kremers J.J.M. (1986), “The Dutch disease in the Netherlands”, published in the proceedings of the Conference "Natural Resources and the Macroeconomy", held in London on 10 - 11 June, 1985, Oxford : Blackwell, ISBN 0-631-15087-0, p. 96-136.

Ma Y., Chen Z., Shinwari R. and Khan Z. (2021), “Financialization, globalization, and Dutch disease: Is Dutch disease exist for resources rich countries?”, Resources Policy, 72, p.102

Mien E. and Goujon M. (2021), “40 Years of Dutch Disease Literature: Lessons for Developing Countries”, Comparative Economic Studies, pp.1-33.

Miller K., Bridgen K., Santillo D., Currie D., Johnston P. and Thompson K. (2021), “Challenging the Need for Deep Seabed Mining from the Perspective of Metal Demand, Biodiversity, Ecosystems Services, and Benefit Sharing”, Front. Mar. Sci., Sec. Marine Ecosystem Ecology, Volume 8 https://doi.org/10.3389/fmars.2021.706161.

Neary J.P. and Van Wijnbergen S. (1986), “Natural Resources and the Macroeconomy: A Theoretical Framework”, in J.P. Neary and S. Van Wijnbergen (Eds) “Natural Resources and the Macroeconomy, Oxford, Basil Blackwell Ltd.

Neumayer E. (2004), “The Impact of Political Violence on Tourism: Dynamic Cross-National Estimation”, The Journal of Conflict Resolution, Vol. 48, No. 2, pp. 259-281.

Nkusu Mwanza (2004), “Aid and the Dutch Disease in Low-Income Countries: Informed Diagnoses for Prudent Prognoses”, IMF Working Paper No. 2004/049.

Nyatepe-Coo Akorlie A. (1994), “Dutch Disease, government policy and import demand in Nigeria”, Applied Economics, 26:4, 327-336, DOI: 10.1080/00036849400000079

Ramos F. M. (2020), “Sudden Influxes of Resource Wealth to the Economy: Avoiding 'Dutch Disease'”, Research & Policy Brief, (31).

Razin A., & Sadka E. (2020), “Managing natural resources: The role of the Israeli sovereign wealth fund. Israel Economic Review”, 17(1), 32-54.

Reisinezhad A. (2020), “The Dutch Disease Revisited: Theory and Evidence”, HAL Id: halshs-03012647, https://shs.hal.science/halshs-03012647.

Rudd David (1996), “An Empirical Analysis of Dutch Disease: Developing and Developed Countries”, Digital Commons, Illinois Wesleyan University.

Sachs J.D. and Warner A.M. (1995), “Natural Resource Abundance and Economic Growth”, NBER Working Paper Series, Working Paper 5398, https://www.nber.org/papers/w5398.

Salter W.E.G. (1959), ”Internal and External Balance: The Role of Price and Expenditure Effects”, Economic Record, vol. 35, no. 71, pp. 226-238.

Stergiou A. (2020), “Geopolitical challenges in the Eastern Mediterranean: Natural resources and regional power balance”, International Affairs Review, 18(2), 214-235.

Swan T.W. (1960), “Economic Control in a Dependent Economy”, Economic Record, vol. 36, no. 73, pp. 51-66.

Swan T.W. (1963), “Longer-Run Problems of the Balance of Payments”, The Australian Economy: A Volume of Readings, eds HW Arndt & WM Corden, Cheshire, Melbourne.

Toprani A. (2021), “Hydrocarbons and Hegemony”, Joint Force Quarterly, Vol. 102, https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-102/JFQ_102.pdf