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PRIVATIZATION THROUGH CONCESSION AND THE PERIL TO PUBLIC INTEREST - THE CASE OF "EGNATIA HIGHWAY"

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Abstract
This paper focuses on the financial and developmental effects of privatization of public infrastructure projects through based on the case study of 'Egnatia Highway' that connects the port of Igoumenitsa in Western Greece with the Greek-Turkish borders in Thrace. Following an informative chronicle of the creation of the 'Egnatia Odos', in the second part of the manuscript, we develop the theoretical framework of our analysis by studying the history and the effects of similar concession projects in Greece and abroad. Specifically, we discuss the Morandi Bridge in Genoa, the motorway around Strasbourg, public roads in Croatia, as well as similar cases outside Europe and Latin America, in particular. In the main part of the study, we present a detailed analysis of the intended 35-year concession of 'Egnatia Odos' based on data from past years and official forecasts concerning the operation, maintenance and commercial exploitation of the specific public asset. Our analysis reveals that avoiding the concession and sustaining public management benefits public interest, Greek society, and the economy. Data prove that public management will generate significantly higher profits for the State while keeping the toll charges at lower levels. At the same time, given the geo-economic significance of the highway in the light of collective management in the Balkans, controlling the specific asset is of exceptional national economic importance.

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1. Introductory remarks and the history of the specific infrastructure project

Egnatia Highway (EO) is the main horizontal road axis, of a total length of 657 km, that crosses Northern Greece from the port of Igoumenitsa to the main Greek-Turkish border at Kipoi. Construction works started in 1977 and were completed more than a decade ago. This is a closed highway of international standards, with two traffic lanes and an emergency lane per direction, separated by a median strip. This is an extremely important infrastructure investment of transnational significance for the development of the region it crosses.

Given the directives of the EU in order to finance this ambitious project and the realization that this was the best way to overcome bureaucratic tie-ups of the Greek public sector, "Egnatia Odos S.A." (EO), 100% owned by the Greek State, was established in 1995; its purpose was to complete the construction and to undertake the operation and maintenance of the highway. EO was supervised by the Ministry of the Environment, Planning and Public Works. Observing the policies following the last financial crisis (from 2011 and onwards), the Hellenic Republic Asset Development Fund (HRADF, https://www.hradf.com/en/) was appointed by the Ministry of Finance to have the right to vote at the General Assembly of EO, in order to initiate and implement the concession of the operation, maintenance and exploitation of EO.

The total budget for the completion of the main axis (including design, construction, expropriations, and administrative/operational costs) came to approximately €5.6 billion (excluding VAT). If we include the Vertical Axes connecting the highway to the main northern gates to South-Eastern Europe the figure comes to approximately €7 billion, co-financed by EU (2nd and 3rd Community Support Framework) and national resources, mainly with loans provided by the European Investment Bank (EIB) to the Greek State (Ministry of Finance), as well as by private Greek financial institutions to EO. All the loans to the Greek banks were recently repaid by EO[1], while the debt to the EIB (total initial budget of €2.24 billion) is still being paid by the Ministry of Finance[2].

The implications of EO are quite significant and already visible (http://observatory.egnatia.gr). Regarding accessibility, there are direct benefits for the five main transit regions - Epirus, Western Macedonia, Central Macedonia, Eastern Macedonia & Thrace, Thessaly – with 10 border stations at four cross-national connections to Albania, North Macedonia, Bulgaria, and Turkey. The main axis connects 11 Greek

1. Repayment included all bank claims, although there is still a pending legal dispute concerning the total amount of the debt.
2. It should be noted that despite the intended privatization (concession) of EO, the Greek State will continue the pay back the construction loan to the EIB, although the asset and its exploitation will be granted to the private sector.

cities – Igoumenitsa, Ioannina, Metsovo, Grevena, Kozani, Veroia, Thessaloniki, Kavala, Xanthi, Komotini, Alexandroupolis with each other and with four ports and six airports. Moreover, Egnatia Odos is a transport link connecting 48 organized manufacturing zones (including industrial areas and parks, industrial business estates, steam power plants, logistics centers, etc.); this is extra evidence to the economic importance of the motorway. Last, but not least, with respect to its cultural effects, EO facilitates access to 85 archaeological sites, 75 museums, 78 places of distinct natural beauty, more than 250 traditional villages, resorts, and facilities hosting cultural events. Finally, road safety has been substantially improved as EO is 5 times safer than the alternative road network (old national roads). Comparing the years before with those after EO operation (data till 2011), it appears that in the major road networks of Northern Greece there is a more than 70% reduction in the number of motor accidents, while fatal injuries also dropped by 60%.

This case study exhaustively analyses the financial and developmental aspects of the project and evaluates the implications of its concession for the public interest. For this reason, the authors sum up the detailed analysis in the report conducted in December 2020 with the support of the Association of EO Employees (https://syllogosseteo.files.wordpress.com/2020/12/09dek2020_main_study_final.pdf).

2. Worldwide and Greek painful experiences from concessions of public interest infrastructure projects

Starting with the international experience, we have chosen four European cases and one from Latin American. Morandi Bridge is perhaps one of the most familiar examples. The bridge did much more than simply connect the eastern with the western part of Genoa. The bridge used to be an architectural asset of the city, the birthplace of Christopher Columbus, that hosts the largest commercial port of Italy. Ricardo Morandi built the bridge in the 1960s introducing, thereby, a multitude of aesthetic and construction innovations that made it one of the most beautiful bridges in Italy.

In 1999, the maintenance and exploitation of Morandi Bridge was transferred to the company Autostrade d' Italia, owned by Atlantia, which is owned by the holding company Edizione that, in turn, belongs to the well-known Benetton family. Along with Morandi Bridge, the same family took control of nearly half of the motorways of the whole country for a period up to 2038. At that time this was considered the epitome of innovation and the brave modern entrepreneurial spirit. In the following years, the management of infrastructure and motorways became extremely important for the holding company: in 2019, 42% of its total assets (€14 billion) came from this very activity, while the sale of clothing items (at 5,000 shops around the world with 8,000 employees) contributed a mere 4%!

During the same period, even in less wealthy countries than Italy, large scale works were carried out at similar bridges for maintenance purposes and, further-

more, for reinforcing their structural strength. In Genoa's case, on the contrary, well-documented concerns were publicly expressed about the over-exploitation of infrastructure, including Morandi Bridge: for instance, in 2003, Marco Pronti, Professor of Transport Economics at the Polytechnic University of Milan and adviser to the government, highlighted the issue of exorbitant increases in tolls paid by road users and stated that Autostrade is the second most profitable company in the world. Pronti also denounced the motorway lobby for blackmailing the state, threatening not to invest unless its demands for further toll increases were met. The professor concluded his interview stressing that "concessions are an automatic mechanism of corruption" (La Repubblica, 2003).

Specific concerns about the Genoa Bridge have been raised by other sources, too. Late in 2017 or early 2018, audits showed that the bridge had weakened from 10% to 20%, on average, as stated by a Supervising Engineer from the local Ministry of Infrastructure and Transport (Glanz, 2018, New York Times). According to the same person, a scientific article had also been published by an engineer from the University of Genoa, who recommended that the entire bridge should be replaced! Additionally, a relevant question was raised in the Italian Parliament on 20 October 2015, addressed to the Ministry of Transport and Infrastructure, which stated that "Autostrade company has the necessary financial resources, from tariff increases alone, as agreed on in the concession approved, in order to start the necessary works" (Senato de la Repubblica, 2015). Nevertheless, the concessionaire did not respond at all, despite constant protests by the residents around the motorway leading to Morandi Bridge, because the sound-proof panels were displaced by the strong winds causing accidents involving drivers and pedestrians! The result was disastrous: on 14 August 2018, Genoa Bridge collapsed causing the death of 43 civilians in a pre-announced tragic accident.

Justifiably, public reactions were extremely severe – high-ranking government officials argued for the revocation of the concession agreement and demanded the imposition of fines of hundreds of million euros for the criminal negligence of the concessionaire Autostrade d' Italia (Kathimerini, 2018). Nonetheless, the license to Autostrade (Glanz, 2018) was renewed by the Parliament.

In case someone would argue that the case of Genoa Bridge may have been an extreme, yet non-representative example, there are also other similar cases: "*after cracks were observed in a tunnel northwest of Genoa that partially collapsed last year, Italy's Ministry of Transport ordered a thorough inspection of the region's elevated crossings and bridges. Almost all had safety problems and had to be repaired*" (Panigiani, 2020). The example of the Genoa Bridge, which is not the only one, essentially contradicts the public interest nature of conceding infrastructure of strategic public interest and, in particular, motorways. The same conclusion can be drawn if we consider three additional European cases. In England, a thorough investigation assessed the governmental promises that justified concessions: "*the government has justified its*

policy in two ways. First, the use of private financing, despite inherently higher costs, would provide the investment that the public sector could not afford. Secondly, it would maximize the (value for money), a concept that means lower lifetime costs, including the cost of transferring risk, compared to the conventional government procurement. The article presents the accounting and financial data to analyze the investment, costs including the cost of using private capital in order to assess the government's allegations. The conclusion was that the concessions were "proved to be more expensive than expected, thereby cancelling the cost advantage". In addition, "*our analysis shows that the cost of risk transfer was very expensive*" (Shaoul, *et. al.*, 2006).

In France, reactions were provoked when there was an announcement that a modern motorway around Strasbourg is to be built, using the concession method, by the French multinational company "Vinci", which will run it for 55 years. The project met with unequivocal reactions by local movements and environmental organizations, due to the damage it will cause to the environment, threatening the survival of rare and protected species, public health and climate (Counter-Balance, 2020).

In Croatia, in October 2014, an alliance of seven unions and seven civilian-society organizations was formed to collect the necessary number of signatures in a petition for a referendum in order to incorporate the following article in a law being discussed at the time by the parliament: "*public roads are of strategic interest and are prohibited to be offered to concessions*". The reason that led to this mobilization was the expressed willingness of the government to seek a concessionaire for 1,017 km of modern highways, constructed in the early 2000s at a cost of €5,8 billion. Taking into account the draft-tender, the concession would be granted for 35-40 years, and bidding would start at 2.4 billion with a ceiling of €3.2 billion (Milekic, 2014).

Outside Europe and, specifically, in Latin America, where concessions began in the 1970s and 1980s guided by the World Bank, more serious economic crimes have been recorded. An extreme but illustrative example is the bail out by the State of the concessionaire who took over Mexico highways in the early 1990s. The estimate for the concessionaire's rescue cost is 7- 12 billion dollars, in other words 1% to 1.7% of the country's GDP (Guasch, et. al. 2007)! In conclusion, many examples around the world make it clear that concessions have been the foundation of high ephemeral profits to the detriment of the public and citizens-users, leading, at the same time, to the technical downgrading and rapid devaluation of public infrastructure.

If we now focus on Greece, concession contracts are considered a subcategory of Public-Private Partnerships (PPPs) and fall into the category of purely conventional PPPs. Unlike other types of contracts, according to which a company receives a fixed fee from the public for the implementation of a project or the provision of a service, in concessions the company's fee mainly comprises the concession of the project management and operation. The benefit concessionaires may bring to the public is related to the mobilization of private funds to complement public resources.

The form of concession was chosen for the construction and management of highways, vehicle parking facilities, marinas, and other infrastructure projects. The 1st generation of concession projects began in the 1990s and included Attiki Odos, Eleftherios Venizelos Airport and the Rio-Antirrio Bridge. The 2nd generation projects include the Olympia Road, the Ionian Road, the Central Road, the Aegean Highway and the Moreas Highway and were signed in 2007-2008. Among the concessions of the 3rd generation are the concession of Alimos Marina, the extension of the contract for Eleftherios Venizelos Airport, a double extension of Attiki Odos, expected to be procured in the first half of 2021, Kasteli Airport in Crete and other infrastructure projects under discussion.

The effect of the pandemic is an unprecedented recession, more intense than the one provoked by the recent financial and economic crisis. The successive waves of relief measures announced by the government did not prevent a massive wave of 'padlocks', especially in cases of small and medium enterprises (IME GSEVEE, 2020 – Institute of small enterprises - Hellenic Confederation of Professionals, Craftsmen & Merchants) or the reduction of the income of thousands of workers, since even those who joined aid programs (i.e. Co-Work), did not prevent cuts to their pay. An exception to the rule of generalized loss of income and even profits, proved once again to be the seven concessions that operate on Greek highways, namely: Olympia Odos (Elefsina - Corinth - Kalamata), Rio-Antirrio Bridge, Aegean Motorway, Central Road, Nea Odos, Moreas (Corinth - Tripoli - Kalamata) and Attiki Odos. The highways, despite taking advantage of opportunities opened by the public to mitigate the effects of the lockdown, like any other company, regardless of their financial size, are seeking compensation from the Greek Government, citing the loss of revenue recorded compared to 2019.

The seven concessionaires requested from the State a total amount of €83.41 million (Lialios, 2020). These claims directly contradict the interest of Greek taxpayers – even if they are provided for in the concession agreements, they are equivalent to a moral scandal and cannot be compared to the aid provided by the Greek Government to entrepreneurs. The difference is both qualitative and quantitative, as in this case we are dealing with a reimbursement of profits, similarly to the case of the Aegean airline company.

Past experiences convince us that the claim for compensation by private road operators is not an exception to a regime of orderly, predictable, and contractual relations – in fact, current concessionaires' claims can be characterized as the fourth episode in a series of similar claims in the last 15 years. The first episode began immediately after the agreements were approved by the Greek Parliament in 2008. The reasons were the obligations, undertaken by the Greek Government, to complete the archeological investigations and the expropriations in the provocatively short period of 1.5 years, which was absolutely impossible. Given that this phase lasted five years, the

state paid hundreds of millions in compensation (Kathimerini, 2013). "*The projects on the five highways are proving to be 'undermined' from the beginning, with the 2007 contracts causing a confusion of responsibilities, from which Contractors, Banks and the State are rushing to take advantage, each trying to load the others with the blame*" (Tzanavara 2010).

Even before the extra episodes of appreciation for concessions unfolded, "*a European record of cost and precision overruns characterizes specific Greek infrastructure projects, according to a Community report, exceeding of even 100% of the cost of Greek infrastructure projects are revealed. It is also estimated that in our country one kilometer of motorway is worth up to EUR 65 million, when the most expensive project in the other Community States is paid for by the State at most EUR 20 million per kilometer. On Attica Motorway from 9 million EUR per kilometer to the final 'bill' of 20 million per km*" (Kadda, 2009).

The second episode of the revision of concession agreements was during the Memorandum period, when the decrease in traffic led to a record drop in the income of concessionaires and banks, which entered a period of crisis and loan stagnation, reluctant to finance major projects. "*The 'juice' behind this banking policy is the interest rates. The loan agreements that were signed in 2007 ranged from 1% -1.5% when today in the interbank market they are around 5%. They claim that the financial model went bankrupt within four years and demand changes, seeking to secure future profits from the first "deviation" and hiding that the contracts expire in 2037, when much will have changed*" (Tzanavara, 2011).

The third episode occurred in 2016, when the Greek government was accused of not paying the public share on time with a long-term delay (toxrima.gr, 2016). It was estimated that the first three compensation episodes alone increased the actual cost of the projects by € 6 billion (Lialios, 2017)! Successive increases in the cost of public works borne by the concessionaires were criticized even by the European Court of Auditors: in their special report on Public-Private Partnerships, they stated that "*as a result of the payment of the State to the concessionaires and the significant increase of the financial costs, the total cost of the Olympia Odos project per kilometer increased by 69%, from 7.7 to 13 million euros. Meanwhile, the length of the highway to be built was reduced by 45%. Similarly, in the case of the Central Greece highway, the total cost of the project per kilometer increased by 47%, from 13.7 to 20.2 million euros per kilometer, while the highway to be constructed shrank by 55%. Overall, due to the restart, the total cost of the three motorways increased by 36%, from € 9.1 million to € 12.4 million per kilometer, and the EU contribution to the total project cost per kilometer increased by 95%, from € 2.1 EUR million per kilometer to € 4.1 million per kilometer*" (European Court of Auditors, 2018).

Last, but not least, there are certain scandalous financial aspects that can be drawn from concessionaires' published balance sheets. Our main observation relates

to revenues and how they were formed over time. In the 2012–2019 period under examination, the highways conceded was the industry that not only protected its revenues but even reported an upward trend.

Obviously, concessions did not reduce the costs for the Greek state and taxpayers or for highway users. On the contrary, concessions proved to be a source of easy super profits and a 'haven' for the shrinking construction sector in Greece (metaforespress.gr, 2020), at a time of shrinking wages and pensions and extreme financial uncertainty. Interestingly, the same trend is seen in the cost announced, which raises questions, since on an operating road axis there should not be major differences in operating costs. A closer look reveals that the depreciations undertaken were probably increased for accounting purposes[3]. Moreover, the construction, and in many cases the operation of the highway, has been subcontracted to corporate subsidiaries. It is obvious that pricing of services does not fall under the obligations of the law on public tender procedures, and it is freely decided on by the two contractual parties.

Another interesting observation concerns the significant fluctuations of loan interest rates. Regarding loans, restructured more than once, these are always accompanied by interest rate hedging agreements, i.e., protection from increases in Euribor, Libor, ECB, etc. As a practice in a period of interest rate increases, this seems to be reasonable, even at potential cost. In our case, however, with a steady decline in interest rates for more than seven years, this is a wrong choice or even a case of mismanagement. This is even less justified when banks also participate in the shareholding structure of concessionaires.

Concluding, besides the transaction with related subcontractors and possible overpricing, EBITDA is consistently receiving half of the sales in all concessions. Of the €1 paid by the user, 0.20 is VAT, 0.40 is earmarked for safety, operation and maintenance costs and the remaining €0.40 serves the concession contract and profits of the concessionaire. It turns out that such practices do not serve the public interest, while the user of the infrastructure receives services that could be provided at half the charge imposed.

3. Egnatia Highway: the project, operation and maintenance

EO, as part of the Trans-European Road Network, is one of the most modern and high-tech road axes in Greece. Based on relevant estimates, EO annual traffic load exceeds 3 billion vehicle-kilometers travelled.

3. It should additionally be noted that this is a matter of depreciation on fixed assets of the company acquired using government grants, loan funds with government collateral, operating income, and minimum equity.

In total, EO manages the operation and maintenance of an extensive motorway network of 916 km (including the vertical connecting axes[4]), undertaken by external Contractors appointed through the public open tendering procedures stipulated, and coordinated and supervised by EO staff.

The scope of these contracts includes:

i. Road maintenance (daily inspections and surveillance, rehabilitation/repair and improvement works including rapid repairs of dangerous faults/damage, fault reporting/damage caused by drivers through www.egnatia.eu website, winter maintenance, maintenance of 3,500 km of safety barriers, repainting of horizontal road signage and large or smaller information signs, restorations of inscriptions on walls and signs, restoration of cables and sabotage and cleaning services on the road, rest and parking areas).
ii. Road operation: 6 Traffic Control Centers operating on a 24-hour basis, 100 Electronic Variable Message Signs, 180 Variable Speed Limit Signs and 850 Electronic Traffic Lane Definition Signs, operating 800 SOS Telephones and 34 Weather Stations, 60 traffic measuring stations on the road network of Northern Greece and the traffic management system.

EO coordinates and supervises the contracts already established. Experts, engineers, and technicians guide and assist contractors, while, in parallel, they develop and implement important innovative applications for traffic safety, unhindered movement of vehicles, environmental policy, statistics and traffic data[5].

In the EO's 2019 financial statements, the acquisition value of fixed assets was €6.43 billion, referring to the total net amount spent for the construction of the main and vertical axes of EO up to 31/12/2019[6], not to mention that, apart from construction, there are other costs related to the development of the highway and, of course, the costs of expropriations, borne by the "Ministry of the Environment, Planning and Public Works" and handed over to EO.

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4. The entire network consists of motorway A2 "Egnatia Odos" 657 km, A25 "Lagadas – Serres – Promachonas" 96 km, A29 "Siatista – Kristallopigi" 70 km, A1 "Axios – Evzonoi" 60 km, A23 "Komotini – Nimfaia – Greek-Bulgarian border" 22 km and the "Aktio – Preveza" immersed tunnel with its access roads of 4.7 km.
5. EO staff developed important systems for centralized management of the highway – for instance: Traffic Measurement System of Northern Greece, Management of the Traffic Model of Northern Greece, Road (RMS) and Bridge (BMS) Maintenance Management Systems, Geotechnical Monitoring System, Basic Maintenance Management System (RMMS) and Road Claims (RCMS), User Road Damage Reporting System (MDNS), Transit License Management System (VPMS) and Electricity Invoice Management System (NRG Management System), Management System for Fixed Electromechanical Equipment, Operation of a Network Monitoring Center, Observatory, Promotion of Projects of Intelligent Transport Systems, and the content of the corporate Environmental Policy.
6. Nevertheless, EO, besides its main role, implements a number of other projects and provides services to other public bodies, either through assignment by the Greek State or through direct agreements with municipalities, prefectures, etc.

Cumulative depreciation by 31/12/2019 had amounted to €676.27 million (82.45 million in 2019 alone – keeping in mind that as depreciation is correlated to the financial exploitation of the asset, in our case it actually started in 2010). As the depreciation period – being determined by the Ministry of Finance – lasts for a maximum period of 50 years, after the fixed asset has been fully exploited, annual depreciation will be at least €128.69 million (dividing 6.43 billion by 50).

Since concession is neither legally nor institutionally required, nor do its operations generate financial losses or any non-financial net burden for public interest, it is absolutely reasonable to consider the net value of the asset to be sold as a minimum price. The acceptance of a lower offer would be irregular raising questions with respect to the seller's motives. In our case, the reasonable fair value for the concession of EO's assets is derived from the non-depreciated value of the investment - which on 31/12/2019 was €5.76 billion (subtracting cumulative depreciation from the acquisition value of fixed assets) – reduced by the non-depreciated value after the concession period (35 years in this case), when the highway will return to the public sector. Given the above, this will be €1.26 billion (calculated by deducting 128.69 million from the 5.76 billion and multiplying by 35). In other words, following the method of accounting valuation, the minimum price for the concession should be €4.50 billion.

EO also constructed the vertical axes connecting it to neighboring Balkan countries. Due to the increased percentage of EC contribution (60%), tolls were not allowed along the specific roads in the first years of their operation. This has temporarily changed as the Commission accepted the term that toll revenues from the vertical axes will only be used to serve the public debt of the country. Yet, this provisional arrangement is not provided for in the concession agreement, which stipulates that all revenues will be collected only by the concessionaire[7].

In fact, from 2016 to 2020, €33.23 million has been secured for debt repayment (note the strong decrease of traffic due to the pandemic in 2020). Given the following assumptions – (i) the initial traffic load in the concession period of 35 years to be at the level of the year 2019 with an annual increase of 1.5%; (ii) proportional charges, as foreseen in the concession contract, to rise from today's 0.024 up to 0.051 €/km (excluding VAT), and (iii) an initial reduction of traffic, due to increased tolls, by 10% – it turns out that, from the two vertical axes through Serres (A25) and West Siatista (A29) alone, the estimated revenue which could contribute to the reduction of public debt is €1.47 billion!

7. Today, all toll stations on the vertical axes are in operation, although issues of charging length costs are still pending.

4. Chronology of EO concession procedure by HRADF and the paradoxical project form

In June 2011, Egnatia Highway and its three main vertical axes were included in the public property portfolio to be privatized (2012-2015), in order to contribute towards the repayment of the country's public debt. At the end of the same year, EO supervision was handed to the newly established HRADF, which was to launch the concession of the operation, maintenance, and exploitation of the highway. In August 2012, the Inter-Ministerial Committee for Restructuring and Privatization (Government Gazette 2316B/10-8-2012) transferred the rights of EO to HRADF.

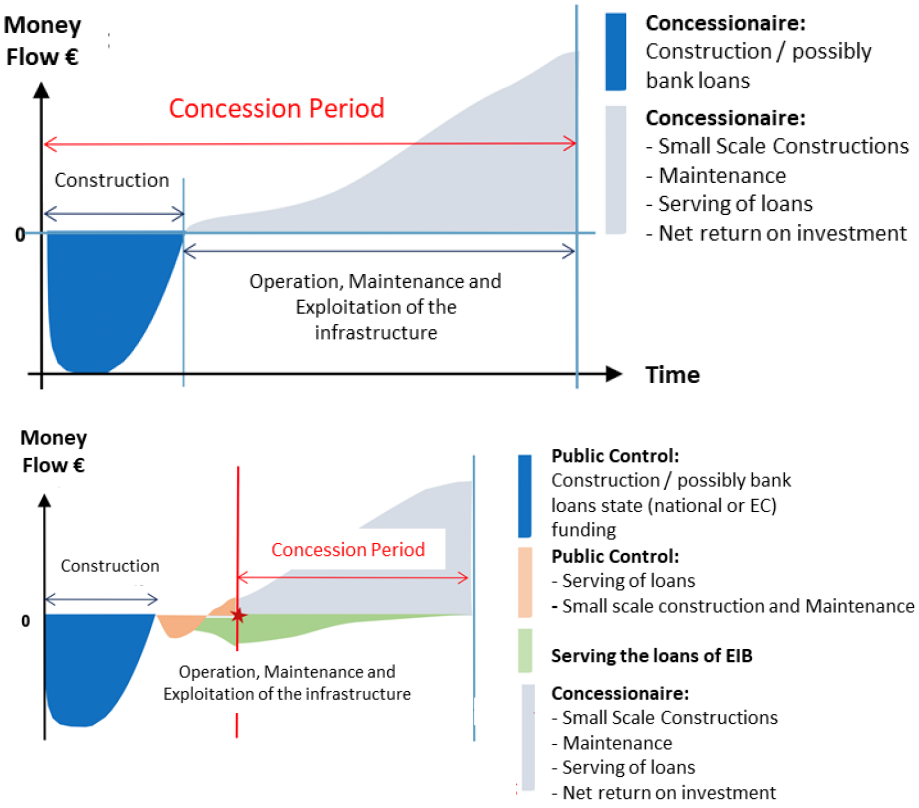
On 16/11/2017, HRADF proceeded with the "Invitation to submit an expression of interest for the award of a service concession agreement in relation to financing, operation, maintenance and exploitation of Egnatia Odos and its three vertical road axes". In the announcement of the relevant tender procedure, the duration of the concession was set as a period of up to 40 years. On 16/2/2018, applications were received from 9 investment schemes, of which seven (7) pre-consortia were pre-selected (16/5/2018) and asked to submit binding offers. Large investment groups from abroad participated mainly in partnership with major Greek construction companies.

According to Directive 2014/23/EU, "*in order to avoid market segregation and restriction of competition*", the duration of the concession should be limited to the period in which the concessionaire can reasonably complete the amortization of its investment. Below is a typical cash flow chart of a motorway concession contract, where the concessionaire undertakes the financing and construction of the project in exchange for its exploitation for a sufficient period of time, as well as the corresponding chart for the "paradoxical-conflicting" form of the specific concession of EO.

It appears that the concession agreement intended for the specific Highway significantly differs from a standard concession contract: it concerns an infrastructure project that was already fully constructed with EU and national funds, needing very little new investment - the most important new investment being to upgrade the Chalastra-Evzonoi vertical axis with an estimated budget of no more than €290 million, which does not justify the need to seek for an investor to manage a fixed asset totaling €7 billion according to the provisions of the Directive quoted above.

As already described, the concessionaire will receive an asset with no pending issues and free of burdens. The concession coincides with the onset of high profitability from the exploitation of the highway for 35 years. In this sense, public interest could only be served by receiving a sufficient prepayment of future income in the form of a "concession fee". Moreover, this argument makes sense if the government faced an urgent need to raise future revenues in financial terms, better than those of today's public borrowing. Yet, even this is not the case anymore, since currently government lending has very low interest rates.

Figure 1. Traditional model of Concession and the special case of EO



So, the main plausible reason for proceeding with the EO concession was the pending Memorandum obligation since 2011 – Greek governments had failed to develop and submit to the "lenders" a well-documented, convincing, alternative plan proving it would have better results, as we are doing in this paper. At the same time, we must admit that construction groups, whether domestic or European, obviously exert very strong pressure to undertake such an extremely profitable asset.

Additionally, the following issues arise: Egnatia Odos was EU-funded and constructed as a development project for the regional areas of Northern Greece, which were among those with the lowest GDP p.c. in Europe. Raising tolls at the level foreseen in the draft concession contract, without this being justified by future investments to be done, offset the developmental character of the project. It was to be expected that travel would be reduced, especially among the economically weaker members of the population, after passing on the increased costs to MO users, thus giving them an incentive return to the old networks, which degraded road safety.

Assessment of the value and the actual cost of the concession is extremely important for the financial interests of the Greek state. On the other hand, it is very tricky to effectively assess the future necessary repair and maintenance burden. Candidates for the concession may overestimate artificially extensive relevant costs, in order to justify a longer duration and a lower price of the concession contract planned.

Similarly, the attempt to estimate future traffic loads and, therefore, revenue through tolls, for an extremely long period (35 years), entails an extremely high degree of uncertainty. It is a given that in the present circumstances anyone interested in the operation of EO, would present the worst possible scenario of future traffic loads as the main one.

In addition, for all the above very important issues, there is no publicity, open discussion or consultation – on the contrary, HRADF proceeds with secret pre-negotiations with the candidate concessionaires.

Finally, if we try to compare other concession highways with Egnatia Odos, which remains a public highway, we should note that (i) the cost of transit for users of other highways in Greece is currently more than double compared to that of the EO (0.065 €/km compared to 0.03 €/km); (ii) operation and maintenance costs of the public EO are significantly lower than those on highways under concession contracts (a provocatively shocking example is Attiki Odos).

5. The finance of EO operation

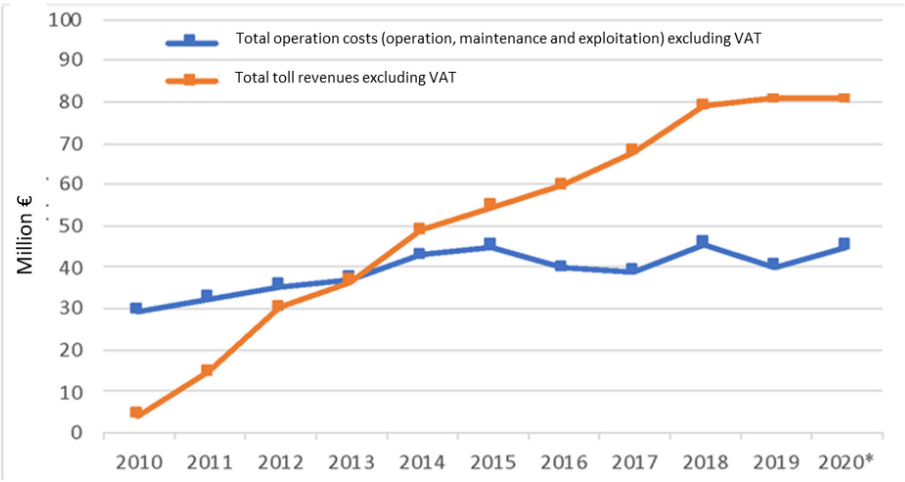
In the previous period – 2010 till 2019 – of EO annual operation, maintenance and exploitation costs and tolls ranged from 42 to 50 thousand euros per operating kilometer, excluding VAT (estimation for 2020 was 47,821€/km). Costs per kilometer were relatively stable at an average figure of 47,500 €/km, although, in the same period, operating kilometers rose/dropped from 620 up/down to 241 (due to the gradual completion of basic construction) and, in addition, heavy road maintenance works were launched in 2018.

On the other hand, the operation of toll stations started in 2010, after the completion of the construction of the entire main axis. Throughout that period, charges on EO were between 0.02 and 0.03 €/km (excluding VAT). A recent ministerial decision stabilized toll costs for users at 0.03 €/km – however, as already mentioned, the draft of the concession agreement provides for a very significant increase up to the level of the other privatized highways of the country (0.065 €/km). On an annual basis, toll revenues started from €4 million in 2010, and rose to €81 million with 16 toll stations by 2020 (estimation).

The following chart presents the annual evolution of revenues and total costs of Egnatia Highway and its Vertical Axes till 2020. After 2013, the year when 6 toll stations were in operation along 740 kilometers, toll revenues rose above the operating, maintenance and upgrading costs, despite the relatively low charge already mentioned.

Based on the above, the Financial Statements of EO may report losses in the balance sheets published but they include depreciation of the fixed asset. On the other hand, positive EBITDA since 2014, reaching €33.17 million in 2019, indicates the viability of the operation, as well as the liquidity capacity for new investments (after repayment of loans) in the medium run. Similarly, from 2013 onwards, current assets exceeded current liabilities – in fact, current assets were more than ten times higher in 2019 (€282.12 million compared to current liabilities at only€ 22.16 million).

Figure 2. EO total operation costs and toll revenues till 2020



In fact, EDITDA may also increase further since there are several Stations not yet operative, even today, and toll charges may marginally increase.

It is, therefore, strange that the concession of EO operation and maintenance is combined with the construction of the Chalastra - Evzonoi vertical road axis, tunnel upgrade projects, construction of Highway Service - Rest stops and Parking Facilities, etc., thereby essentially reducing the price requested for the concession by the state, although both funding and know-how can be easily and effectively covered by EO itself.

5.1 Detailed presentation of operation, maintenance and highway upgrading costs

Operation and basic/regular maintenance of the EO include all activities required to maintain the service provided at the optimum level: highway cleaning operations, safety barrier replacements, patrols, surveillance costs and emergency response teams, control centers, fire safety, maintenance of electromechanical equipment, road markings, local pavement restorations, instrumental monitoring of structures, geotechnical monitoring, snow removal, as well as relevant payroll costs. It is obvious

that the operating and regular maintenance costs are not fixed per kilometer, but depend on the geographical location, altitude, type, and range of the specific part of the infrastructure.

The following table presents the costs of the activities mentioned above, according to the relevant subcontracting tenders conducted by EO – overall exceeding €20 million annually (excluding VAT) – it is noteworthy that the resulting discounts are 60% on average.

Table 1. Contracts of operation and maintenance subcontracting 2015-2020

Year	Scope of the Contract	Duration	Tender budget without VAT	Average Discount	Contract price excluding VAT	Cost of operation and maintenance per year (excluding VAT)
2018	Operation & Maintenance and construction of toll stations 2018-2020: A	18 months	47,450,000 €	59.11 %	19,401,536	26.6 million €
2018	Operation & Maintenance and construction of toll stations 2018-2020: B	18 months	49,455,000 €	58.21 %	20,668,683	
2015	Operation & Maintenance 2015-2018 (1)	3 years	60,483,871 €	55.30 %	27,488,723	18.3 million €
2015	Operation & Maintenance 2015-2018 (2)	3 years	60,483,871 €	55.18 %	27,485,291	

Another important category of costs results from electric lighting at crossroads and transport junctions, tunnels, frequently foggy sections of roads, etc. With respect to this, it is important to mention the possibility of heavy reduction of such costs by replacing bulbs with new, lower energy consumption lighting (LEDs). (The specific project could be financed by respective surpluses within 7 years.

Moving on, we also need to consider costs for the operation of frontal and lateral toll stations including electronic toll collection systems – personnel's wage costs, systems maintenance costs, civil engineering and electromechanical works, and electronic systems are the relevant expenses. Nevertheless, in this category, we also have to consider that relevant costs can be substantially reduced if we assume the conversion of the toll system into a 'free flow' system.

Next to the operational costs (including regular maintenance) we have to take into account those for heavy maintenance and new construction. The first includes the replacement of asphalt layers, long-term maintenance scheduled or structural reinforcement of motorway structures (bridges, tunnels, support systems), replacement of safety barriers and vehicle interception systems due to aging or changes of specifications, replacement of vertical signs and support bodies, restoration of embankments, repairs to culverts and other hydraulic works, inspections and repairs of damage to underground works, costs scheduled for replacing or modernizing electro-mechanical installations, restoration of existing landslides and new slope failures, etc., plus replacement of metal safety barriers with new vehicle interception systems.

The largest share of heavy maintenance expenditure concerns the restoration of road pavements. If we calculate this based on current costs and historical data from the respective EO subcontracting contracts in recent years, it comes, on average, up to 190 thousand €/km excluding VAT (related discount rates reached 61%). The frequency of road remediation operations is based on the load of heavy vehicles. We estimated that the frequency of restoration has to be between 5 and 10 years and, in parts of heavy truck traffic load, located mostly in the Prefecture of Thessaloniki, at 5 years[8].

On the other hand, there are also new construction works scheduled within the next 5 years. These refer to new or upgraded existing motorway segments, construction of new toll stations, Highway Service - Rest and Parking Facilities, installation of a hybrid analog tolling system in urban areas, upgrading tunnel systems, and reinforcement of structures and restoration of embankment stability. Of these, the most important expenditure concerns the upgrading of a 45 km motorway section along the Chalastra – Evzonoi axis. In our estimate, we consider that the execution of these new construction projects will be assigned through public tenders and the calculations were made based on data from previous similar projects realized by EO, taking into account average past discounts.

Finally, we have to consider other expenses, including management staff costs and various administrative expenses, such as project insurance and support for emergency reasons (Traffic Police, Fire Department, etc.).

Based on the assumptions and analysis above, the estimated total annual costs for the operation, maintenance and upgrade of Egnatia Odos and its vertical axes during the 35-year period (2022-2056) ranges from €56 million to €118 million. In the first years, total expenses will be higher, as construction of new segments is to be expected, while, at the same time period, heavy maintenance works will also be taking place. The average annual cost of operation, maintenance, and upgrade comes to €74 million.

8. Obviously, the forecast of heavy maintenance entails significant uncertainties and risks, which, in the frame of the extremely long-term forecasts for the 35-year concession intended have been exacerbated: during the period of the concession tender, according to information leaked to the press (the unacceptable secrecy of relevant negotiations should be noted here), heavy maintenance costs vary from €1 to €6 billion!

5.2 Analysis of future toll revenues

Revenues from the operation of EO and its vertical axes come almost exclusively from charges for using the specific infrastructure. Tolls yield up to 98% of total revenues[9] – therefore, it is important to discuss in detail the billing assumptions and scenarios, as we do below.

According to the most recent Joint Ministerial Decision, toll charging (including VAT) for the basic category of vehicles using the EO will come to 0.04 €/km in 2021 before the concession; after it, charges will rise again to 0.05 €/km with the commencement of the concession contract (assumed to be in the beginning of 2022) reaching 0.064 €/km by 2024, similar to the rest of the concession contracts concerning other highways of the country. This increase of toll charges projected was made solely to make the intended concession even more attractive.

Below we examine whether holding toll charges at the current level of 0.003 €/km is economically viable, compared to three other alternative scenarios: (i) 0.04 €/km for 35 years; (ii) starting with 0.04 €/km and then, after the 2nd year rising to 0.05 €/km, and (iii) based on the ministerial schedule mentioned above charging up to 0.064 €/km. The basic scenario and the one with an average charge of 0.04 €/km are compatible with the case where the present status will not change, and the concession intended will not proceed.

Analyzing the time series resulting from the specific scenarios provides us with the following conclusions:

i. At the existing low charge of 0.03 €/km, annual toll revenues range from €106 to €178 million, while when the average toll rate is raised to 0.04 €/km, annual revenues range from €134 to €224 million. The other two scenarios, at 0.05 €/km in 2022 and 0.064 €/km by 2024, provide annual revenues ranging from €149 to €250 million and from €149 to €278 million, respectively.
ii. Therefore, cumulative revenues for the 35-year period come to €4.99 billion for the basic, existing charge and rise to €6.28 billion for a modest increase to 0.04 €/km, while in the other two scenarios it rises to €7.01 and €7.78 billion, respectively.

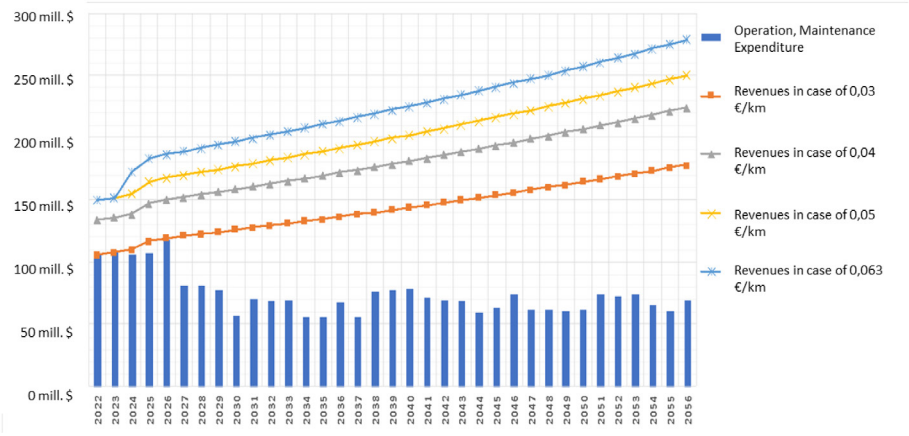
6. Forecasting future results of EO operation and exploitation

Detailed data of costs and revenues were presented separately in the previous paragraphs. The following figure depicts the time series of annual total expenditure and revenues. It is obvious that, when maintaining the current low charge of 0.03 €/

9. Other sources of income are the Rest and Service Stations, the leasing of premises for installing the mobile telephone network, as well as that of energy or telecommunication networks. Furthermore, the compensation of the road administrator due to damage of third-party liability (accidents), as well as the imposition of fines for non-payment of tolls.

km, revenues are slightly above expenditure during the first 5 years, during which execution of new construction and heavy maintenance works is expected to take place. For the rest of the 35-year period, exploitation of EO is to be consistently profitable. As expected, profitability is even higher in the other three scenarios with increased toll charges and, consequently, higher total revenues.

Figure 3. Annual total operation and maintenance expenditure vs total revenues for a period of 35 years (excluding VAT)



In other words, losses do not appear in any of the studied cases. Even in the first five years of the low charges scenario, financial results are marginally above zero. More specifically:

i. In the case of 0.03 €/km tolls, annual profits range from €0 to €114 million. Cumulative financial result over the entire 35-year period is estimated at €2.4 billion.
ii. In the case of 0.04 €/km tolls, annual profits range from €27 to €160 million. Cumulative financial result over the entire 35-year period is estimated at €3,7 billion.
iii. In the case of 0.05 €/km tolls, annual profits range from €42 to €185 million. Cumulative financial result over the entire 35-year period is estimated at €4.4 billion.
iv. In the case of 0.063 €/km tolls, annual profits range from €42 to €213 million. Cumulative financial result over the entire 35-year period is estimated at €5.2 billion.

According to the relevant European Directive, it is important and interesting to calculate the break-even point of toll charging (defined as the amount to be paid by a road user so that total operating, maintenance and upgrading costs can be covered) for the EO case, something that, unjustifiably, has not been done by the Greek State for any

of the national public roads. It turns out that, for the entire 35 years, the break-even charge for the basic category of vehicles (category 2) is 0.0125 €/km (VAT excluded). Any additional charge contributes to the profitability of the highway operation.

Based on all the previous calculations we end up with the following table that compares the financial results of the two alternative management models for the EO and the Vertical Axes: the 1st model reflects the situation when EO retains management and toll collection, while works and services are undertaken through public (sub-) contracts with private entities (the scheme currently operating), the 2nd is the case of moving on with the concession, in which toll collection and undertaking of works and services are to be managed by the concessionaire.

Starting from the intention to ensure sufficient comfort and the highest safety for users, as well as to combine socially acceptable operating costs (tolls) with attaining significant public financial benefits, the choice of a concession contract for an already constructed infrastructure project and for a long period of 35 years is extremely problematic: on the one hand, it multiplies costs for users and, on the other hand, it deprives the State of almost all future financial benefits since it will be receiving only a subset of them.

Sustaining the management under the control of EO with the present model of subcontracting can bring a total profit to the State between €3 billion and €6.15 billion, depending on the toll charge scenario. In this case, it is possible to keep toll charges at lower levels and generate significant profits for the State, at the same time. Instead, in this concession model, given the assumptions made according to the information leaked, notwithstanding the secret negotiation practice unacceptable for public interest purposes, total public financial benefits can be estimated between €1.23 billion and €1.98 billion. When a higher IRR or less favorable assumptions of revenue and expenditure are applied, total profits are significantly limited.

According to low toll scenarios (0.03 €/km or 0.04 €/km), EO will even return/reinvest €85-125million per year. If we consider the high toll charge scenarios (0.05 €/km and 0.063 €/km), this reinvestment may rise to €150–175 million per year, with the Concessionaire returning only €15–17 million (7.5% of revenue) per year to the State! This is, actually, the main message from the economic comparison of the two alternative management models: if the present status is sustained and depends on the amount of tolls, the State will have annual profits of up to €175 million for 35 years, while in the case of concession, this will dramatically drop to €17 million!

Table 2. Comparison of public (financial) benefits in the two alternative cases of EO management

		1st model: EO controls EO (total annual average costs: 74 million €/km)	2nd model: Concession Contract	
			2.a: total annual average costs remain the same (74 million €/km)	2.b: increased total annual average costs: 110 million €/km
Low Tolls scenario: 0.03€/km	**Total Public Financial Benefit for 35 years**	**€2,996,259,328**	-	-
Medium Tolls scenario: 0.04 €/km	**Total Public Financial Benefit for 35 years**	**€4,450,603,127**	-	-
Tolls 0.05 €/km as the minimum charge stipulated in the framework of the concession intended	Public financial contribution (lump sum)	-	€-60,000,000	€-60,000,000
	Annual revenues – total in 35 years	€5,268,671,514	€529,283,240	€529,283,240
	Concession fee at the starting point commencement (lump sum) – IRR estimate ~8%	-	€1,200,000,000	€760,000,000
	Total Public Financial Benefit for 35 years	**€5,268,671,514**	**€1,669,283,240**	**€1,229,283,240**
Tolls 0.0633 €/km as the minimum charge stipulated in the framework of	Public financial contribution (lump sum)	-	€-60,000,000	€-60,000,000
	Annual revenues – total at 35 years	€6,153,930,193	€589,623,531	€589,623,531
the concession intended	Concession fee at the starting point (lump sum) – IRR estimate ~8%		€1,450,000,000	€920,000,000
	Total Public Financial Benefit in 35 years	**€6,153,930,193**	**€1,979,623,531**	**€1,449,623,531**

12. Conclusions

Essentially, the specific concession model only concerns the capitalization of future revenues, i.e., instead of providing €6 billion for ~~the~~ public finance over 35 years, in the best case it will generate no more than a concession fee of €1.5 billion in its commencement (lump sum). In fact, it is considered extremely likely that the concession fee will be much lower, rendering the already problematic concession model into one that is also provocative and scandalous.

In this sense, the concession contract of the fully constructed Egnatia Highway is not a productive investment and will not bring additional benefits. It is, rather, a form of merely privatizing the toll collection procedure, instead of assigning it to a public interest company (EO). Data shows that for the management of EO, including new upcoming construction works, there are no financing/investment needs that justify the necessity for private capital investment through a 'formal' concession contract in accordance with the definitions and provisions of Directive 2014/23/EU (incorporated into national law 4413/2016).

It should also be noted that the construction companies participating in the consortia that expressed their interest for the specific concession also carry out public projects entrusted by the State following public tenders. In these projects the discounts offered by such companies currently amount to almost 50%. As we have already mentioned, in the case of these companies gaining control through the concession, the way is opened for additional profitability if worse conditions are maintained in the technical works they, directly or indirectly, implement.

The best result, by far, for the economy and society is achieved by maintaining the present mixed management model, according to which heavy maintenance and extension projects are undertaken by private construction companies subcontracted by the state. EO and the tolls are publicly controlled. Thereby, besides execution of other public works along EO crossing areas and financing wider projects in the Regions of Northern Greece, according to relevant government infrastructure planning, contribution towards reducing ~~X~~the national debt will also remain significant since depositing a percentage of profits into the Public Debt Servicing Account will continue the repayment of EIB loans for the Ministry of Finance as well.

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