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EMPIRE OF THE OCEAN AGAINST EMPIRE OF THE CONTINENT: AN ECONOMIC ANALYSIS OF STRATEGY

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Abstract

This paper presents an extended Aristotelian thesis, which relates sea power to the emergence of new institutions and organizations, which affect, in turn, economic performance. Institutions embody new knowledge, leading to innovation, "the making" economy more efficient and growth promoting. The *Continental System* introduced by Napoleon Bonaparte, is analysed as a case study of two different systems in conflict: France, a mainly land based power with a centralized government and an economy directed by the state, and Great Britain, a seapower relying mainly on a market economy, with strong trade, industry and relatively efficient financial institutions and organizations like the Stock Exchange, joint-stock companies, banks etc, dominated by private economic interests. Preconceived economic ideas by Napoleon are analysed as to their influence in shaping the Continental System. The papers goes on with an economic analysis of strategy that concludes, as follows: France, not being able to subdue Great Britain through a direct military confrontation, due to Great Britain's mastery of the sea, adopted an indirect strategy of trying to ruin her economy, first by the endeavour to reach her main source of wealth (as conceived by Napoleon) India by an overland route (the Egyptian expedition) and second, by the imposition of economic blockade, ie the Continental System. This ended again in failure because the seapower was inherently economically stronger, and because the Continental System imposed more costs than benefits to Napoleon's European allies, mainly Russia. A continental blockade would be only efficient in the long run if it was "watertight", ie encompassed all of Europe. In order to achieve this, Napoleon was led to wrong strategic decisions, first fighting a two front war (Portugal–Spain and Austria–Russia) and then undertaking the disastrous Russian campaign of 1812. The case study is concluded by generalizing it as a two-player game with asymmetric starting conditions and asymmetric strategies, which is dominated by the strategies of the "naval" player.

JEL classification: N0, N4, C7, C0.
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1. The extended Aristotelian thesis

Aristoteles in his analysis of the "polities" (forms of government) of numerous Greek city–states of preceding and his time (5th and 4th centuries B.C.) argued that sea–power states (islands of Samos, Kerkyra, Aigina and cities of Corinth and Athens) were characterized by democratic governments, while land powers (states of Thessaly, Macedonia, Epirus and Sparta) were either "oligarchic" or kingdoms.

This thesis, appears to have some claim of validity over the centuries: Seapowers tended on the whole to exhibit more democratic forms of government compared to land powers, in relation to each historic period[1] although here too, some eminent exceptions appear. Rhodes, the main seapower in the Eastern Mediterranean and Marseilles, the main in the west during the 3rd century were both republics, as was Rome when it became a seapower in the 3rd century B.C., although Rome was already a republic by that time. The great medieval seapowers, Venice, Genoa and Pisa were also republics, but so also was the Swiss Federation, clearly not a seapower. Portugal and Spain, the leading seapowers of the Renaissance and the early modern era were not republics, although some "democratic" elements existed, like the Cortes in Spain. The United Provinces (Dutch Republic) and England seem to fit better into the Aristotelian thesis, the first being a Federation of seven independent Provinces ruled by General Estates and England having Parliaments during the reign of Elizabeth I and during most of the 17th century when it became a seapower and without interruption since the Glorious Revolution of 1688.

In this paper, we extend the original Aristotelian thesis to relate sea power and democracy to the creation of institutions fostering economy development. This *'extended'* Aristotelian thesis, supports the view that sea power *is linked to the emergence of new institutions and organizations, which reduce uncertainty by establishing a stable structure to human interaction* (North, 1990). *Institutions, determine ethics and codes of conduct and thus provide a structure to everyday life, are the determinants of economic performance* (North and Thomas, 1973), *embody new knowledge, and most of the times lead to innovation through better communications, specialization, and culture. This fosters a better organization of the 'production' making economy more efficient and growth promoting* (Vliamos, 2007).

Kyriazis–Zouboulakis (2004) have analysed the effects of Ancient Athens Naval Law of 482 B.C. (known also as the Decree of Themistocles) in shaping the Athenian democracy's political and economic institutions. By the 4th century modern organization forms like "general" merchant banks, naval insurance, joint-stock maritime companies, an extended services sector and a market economy characterised Athens (Cohen, 1977). Similar developments took place in Venice, (Lane, 1985; Norwich, 1977; Pezzolo, 2006), Genoa (Greif, 1994) the United Provinces (Kyriazis, 2005; Halkos and Kyriazis, 2005) and England (Kyriazis and Zouboulakis, 2003).

It seems that, although democratic institutions developed also in some non-maritime states like Switzerland, only in maritime states did the new forms of institutions and organizations emerge.

As to why this came about, the argument runs along the following lines: Maritime trade and seapower posed a challenge that required the development of specialized organizational skills. On the other hand, Navies were much more capital intensive than armies[2] (Rodger 2003, Glete 1993, 2002, Kyriazis 2006) and maritime expeditions to far off places[3] required huge capital outlays. This again led to the emergence of new forms of organization aimed to reduce transaction costs.[4] Maritime expeditions for trade or war (in the form of, for example, English or Dutch corsairs against the Spanish in the 16th century) became a repeated game.

Initially, first commercial expeditions of the English and Dutch to the spices islands took the form of joint–stock companies limited to one voyage only, ie dissolving at the end of each voyage. Once a voyage was successful and profitable, it was repeated. But if voyages were to be repeated, then why should the joint–stock companies not become permanent since this would reduce the transaction costs of establishing the companies each time anew? This is of course what happened. So, once permanent joint-stock companies were established, and in view of the huge capital outlays required, it became obvious, that by uniting the till then competing companies would bring a cost reduction, taking advantage of the increasing economies of scale. This happened, and the various competing companies merged to establish the English East India Company in 1600 and the Dutch one, the VOC in 1602.

The next step of the game is, that once permanent big joint-stock companies are established, then trade in their stock becomes easier, ie

transaction costs (in this case information costs) are reduced and trade in stock becomes frequent. So, a place where this is undertaken is established, ie Stock Exchanges like those in London and Amsterdam.

Lastly, new knowledge was acquired and this was diffused to the other, non-maritime sectors of the economy. True, the joint-stock model of company (called *"partenrederij"* in the United Provinces) was then used in most other sectors of economic activity, like drainage, port and canal construction, seweries, brick construction, textiles, industrial mills etc. (Kyriazis 2005).

European supremacy in the 17th and later centuries vis-à-vis non-European powers was based mainly to these institutional and organizational forms that did not develop anywhere else in the world. However even within Europe these differences were essential in shaping strategy and giving victory in the almost a quarter of a century long conflict of Great Britain and France[5] by the end of the 18th beginning of the 19th century.

2. The Continental System

By the year 1798 France had successfully withstood all attempts by the other European countries to crush the revolution and had signed peace agreements with them, except for Great Britain. France was at the time the most populous state in Europe, with an estimated population of 25-30 Mio inhabitants (Herold, 1963). Her citizen armies, with the "levée en masse" of the revolution, were also the most numerous in Europe. Armies were then labour-intensive. A training period of two-three months was deemed sufficient for a recruit to learn the rudiments of being a soldier.

On the other hand, as stated before, navies were capital intensive. The construction of a ship took months, and if the period of time is taken into account that was necessary for wood to ripen and dry (for ships to have a long time in service and not to rot within a few years) then the construction period was measured in years. (Glete, 1993; Rodger, 2004). The development of naval technology, training, logistics, organisation (like command, administration, dock-yards, port and facilities and shipyards), took tens of years. The creation of experience and what the French call "esprit de corps" took even longer.

These differences between armies and navies meant that while France could evolve in a relatively short period land armies superior and more numerous than those of its continental rivals, it would take a much longer period to evolve a navy capable of challenging British dominance. In fact, up to the beginning of the revolution, France ranked as the second naval power in the world (after Britain) with Spain the third. But since 1789, the French navy fell into disrepair and fast decline, due to neglect by the revolutionary leaders concentrating on the land peril and to the fact that many of the French navy's officers, members of the aristocracy, had either fled abroad or been executed during the period of terror of 1793–4 (Masson, 1981, Rodger, 2004).

Thus, the French government, being unable to challenge British supremacy at sea, tried to develop indirect ways to strike at Great Britain. Considering that India was the main source of the British Empire's wealth and power, the Directory entrusted to general Bonaparte to lead an expedition to Egypt, this being thought of as the first step to the opening of a land route for the conquest of India.

This first French attempt at implementing an indirect strategy failed because such a strategy could not succeed in the long run in the face of an enemy that controlled the sea, ie could and did interrupt the supply line of an expeditionary force that relied exclusively on sea communications.

The peace of Amiens (27 March 1802) brought a temporary peace with France dominating Europe and Britain, undefeated, dominating the seas. Peace might have been more durable, and might have been used by France in order to rebuild her maritime and naval capability, but for the ambition of Napoleon.

Napoleon's preconceived ideas concerning history and economy shaped his decisions and his strategy. Reading ancient history, he interpreted the Roman Carthaginian conflict by convincing himself that when a land power with substantial resources at its disposal both in population and in land and agricultural production, as Rome, faced a seapower like Carthage, which relied mainly on trade and "immaterial" wealth, the land power was bound to win, as Rome did[6]. In his mind, France and Great Britain were parallels of Rome and Carthage. France was 2,5 times more populous than Great Britain, had about double territorial area and was more or less self sufficient in agricultural products and the most necessary other resources like clothing,

metals etc (Cost considerations of domestic vis-à-vis foreign production did not seem to have played any part in his mind). Thus, his conclusion, in the long run France was bound to win, as Rome did (Herold, 1963).

What Napoleon apparently missed when using this historical analogue for his reasoning, was that Rome won only after it became a sea power and successfully challenged Carthagenian sea domination during the first Punic War. Rome achieved this by harnessing the naval experience of her Allies and subordinate states, like those of the Greek city – states of Southern Italy with their long naval tradition (e.g. Taranto) and by introducing a revolutionary weapon at sea, the "corvus" that transformed sea battles from contests of manoeuver and superior seamanship into equivalents of land battles, where the superiority of Roman legionaries was dominant. (Bagnall, 2002)[7].

By the time of the second Punic War, Rome was the dominant sea-power and Hannibal was compelled to take the long and risky overland route from Spain to Italy over the Alps in order to invade Italy. The Roman navy's command of the Mediterranean isolated Hannibal in Italy and prohibited his ally, king Phillip V of Macedon in joining him there.

Also, if Napoleon had a better understanding of history and the ancient writers, he would not have missed Thucydides lessons and warnings, which he put in the mouth of the King of Sparta Archidamus, at the beginning of the Peloponnesian War: *"And in war it is the expenditure which enables the weapons to bring results, especially in a conflict between a land power and a sea power"*, where, as he stated in the previous sentence, Athens allies contributed money, presumably making her thus more powerful. (de Souza et al., 2004, p. 123).

Napoleon had also preconceived economic ideas, based on superficial knowledge of the economic theory of the mercantilistic school[8]. Real wealth, for him, consisted of land, people, and industry producing for home markets. Trade, and, still more finance, were essentially parasitic activities, and an economy based on them was necessarily flimsy, exploitative and vulnerable. His object was thus to hit Great Britain at her Achilles heel, by denying her European markets for exports and re-exports. He also aimed to deny her strategic imports such as the all-important for her navy Baltic stores. At the same time, he also aimed to ruin Britain in mercantilistic fashion by forcing her to trade on disadvantageous terms, what would be called in todays terminology, adverse "terms of trade", i.e., to import goods which could only be paid for by exporting bullion. (Rodger, 2004). This was a direct application

of French mercantilistic theory, as exposed and implemented by Colbert, more than one century ago. Napoleon seemed to be totally ignorant of advances in economic theory as developed in other countries, notably Great Britain, with Adam Smith's "Wealth of the Nations" (1776), which was already more than a quarter of a century old when he introduced the *Continental System.* Even more astonishing perhaps, he seemed to be unaware of strong non-agricultural economic growth that was taking place in Great Britain, which has been called the "Industrial Revolution"[9].

So, with two Decrees, of Berlin of November 1806 and Milan of December 1807, Napoleon introduced the Continental System, a blockade of British products and trade to Continental Europe. The British response was a series of Orders in Council which declared all ports under French control to be blockaded, and permitted trade with them only on British terms. The effect of all these measures was to outlaw neutrality at sea, permitting ships of every nation to trade only on the terms of one or the other belligerent. The Continental System and the British response thus introduced for the first time in history total economic war. The only important neutral shipowning power not yet under French domination was the United States, but there the measures were resented more in principle by President Jefferson and his Republican party than in practice by the New England shipowners, who were for the most part opposition Federalists, and whose inflated wartime profits reconciled them to a great deal of inconvenience. Jefferson's response was the Embargo Act of 1807, intended to punish both belligerents, by denying them US exports, but in practice punishing principally his own compatriots, the merchants and shipowners". (Rodger, 2004 p. 552; C. Herold, 1963; Crouzet, 1995).

The System's success depended on two conditions: <u>First</u>, it had to be "watertight", that is, no "gates" or "windows" should exist on the Continent through which British trade would flow in and out, legally or illegally. It required a united continent and a solution to the so-called principal – agent problem. Napoleon was forced to conquer any country, even if friendly or neutral, which did not choose to participate in his economic warfare. Simply stated, neutrality was not permitted. Military strategy had thus to be shaped by economic goals, and subordinated to it. As will be exposed further on, this had disastrous results. Further, concerning the principal-agent problem, the Continental System required that "agents" (be it the

governments of other countries, and the people entrusted with the implementation of the measures of the system at all levels, going as far down as simple "policemen", port and custom authorities etc) would comply. This required of course a prodigious monitoring effort and dedication of vast resources. Napoleon had practically to put in place a system of controlling thousands of miles of seashore from the Baltic to the Mediterranean, with hundreds of big and small ports, river inlets, islands and open beaches, to prohibit trade which could and did take the form of smuggling. Since, as will be seen, this was against the interests of both the ruling classes and the population of the continent's countries, France itself not excluded, such a system was doomed to failure.

    Second, even assuming that a watertight Continental System could be introduced and maintained, a farther condition would have to be satisfied, namely, that Great Britain would really be ruined by its application. As will be seen also, this condition also was not satisfied. The entire Continental System was thus flowed from the beginning.

3. Strategic consequences

    In order to apply the Continental System, Napoleon had to bring under his rule Portugal and Spain, since for the time being, after the peace of Tilsit of 1807 Russia was his ally, Austria cowed and Prussia neutral. The squabbles among the Bourbon Spanish royal family gave him the pretext to intervene and place his brother on the Spanish throne, but in Portugal his armies failed, because the British landed an expeditionary force under Wellington, which bolstered the Portuguese. Wellington's army fortified the line of Torres Vedras north of Lisbon, making them impregnable. The French army had to lay down a siege to take them, but they proved too strong. Here, for the first time, during the Napoleonic Wars the predominance of the naval power was demonstrated. Wellingtons army could be supplied by sea, while the French army, before the lines had to be supplied overland, a much lengthier, costlier and unsafe route. The end result was that the French army had to retreat in March 1811 nearly starved, while Wellington's survived more or less intact (Longford 1971).
    Wellington begun his last counteroffensive, and here again the seapower's

strategic superiority was demonstrated through its influence on the concentration of forces on the battlefield. The French army of occupation reached an estimated peak of 350.000 men in the beginning of 1812 (Fletcher, 1997), a multiple of the British Portuguese army. But the French army, being denied sea communications, had to live of the land and so be dispersed at many locations, combined of course with the necessity to control the hostile country and deny the lengthy coastline with its many ports both to British landings and trade. Wellington's army on the other hand, had a secure supply line ending in Lisbon. His much smaller army could march and fight concentrated. Thus the effect of seapower was to equalize or even give numerical superiority to the Allies on the battlefields, against total French numerical superiority, which could not be brought to bear (Chartrand, 2001 & 2002; Fletcher, 1997 & 1998).

The Continental System did hurt to some extent Britain, although the recovery was fast after the first years, and did offer some opportunities for the expansion of French trade on the continent. Without doubt the great losers were the other European countries, among them Russia. Napoleon subjugated once more Austria and Prussia, but he had to bring a Russia reluctant to suffer from the embargo's consequences to heal. Russia had a very important trade in Baltic timber, furs, grain, flax, hemp, iron and tallow with Britain, importing luxury products like coffee, tea, chocolate, spices, porcelain and special clothes and textiles. Under the embargo Russia would have to forego this lucrative to both sides trade. A few years after the peace of Tilsit of 1807 the Russian King Alexander and his advisers decided that the Continental System harmed their country's interests and came back to the old trade patterns with Britain. Thus, long established economic interests proved stronger in the shaping of European Alliances, than personal preferences, fears, enticements or diplomatic efforts. Thus, by 1812, the Continental System had two open gateways at the two ends of Europe, Portugal and some areas of Spain in the Southwest, and Russia in the Northeast. Napoleon had either to abandon the no longer efficient embargo, or to try by military means to compel Russia to come back to it's application. He chose the second course, which led to his 1812 invasion of Russia and the ruin of the Grand Army in the Russian snow. This was the beginning of the end for him.

Thus, driven by the economic necessity of his embargo, Napoleon was embroiled on a two front war, a situation repeated for Germany during the

two World Wars, when again the dominant land power fought against a coallitition led by the dominant seapowers. Every failure against England obliged him to extend his power farther in other directions, "until he overreached himself and fell". (Herold, 1963, p. 224).

4. Economic consequences

The Continental System, if applied strictly, would result in a great reorientation of trade and economic activity of all European countries, and through their control of colonies and trade, of the world economy. European countries imported grain (mainly from other European ones) fishing (herring and whale products the dominant categories here) spices, sugar, coffee, tobacco, chocolate, timber, bullion, ivory, clothing, porcelain and some minerals, to name just some of the main products. The continental countries would have to live without them, if the embargo were to be strictly applied, but of course the populations of those countries were not prepared to forego consumption of these products.

The first effect of the willingness of Europeans to continue their established consumption patterns was smuggling. While it is impossible to estimate to what extent the Continental System was vitiated by smuggling, there is no doubt that smuggling was practiced on a heroic scale and became the most lucrative form of business in Europe. Smugglers plied their trade back and forth across the Channel almost every night and on foggy days. From the coast of northwest Germany long wagon trains of contraband goods traveled into the interior, with the connivance of Napoleon's own brother, king Jerome of Westphalia. Louis Bonaparte, also brother of Napoleon and King of Holland, placed on the throne by him, carried on trade with Britain almost openly. In order to bring him to bay, Napoleon forced him to abdicate and annexed Holland to France in 1810, followed by the annexation in early 1811 of the entire northwest coast of Germany as far east as Lübeck, in a vain attempt to enforce the System (Herold 1963).

Snuggling flourished, but in some parts of Europe, the effects of the blockade were felt severely. In the German provinces of the empire for example, the effects of the blockade lead to great public exasperation. Hamburg was totally ruined by the new measures. Hundreds of ships lay

rotting in the harbor and some of the principal industries, including sugar refining and cotton printing were completely shut down (Herold 1963).

In France the period 1806–1810 was one of rising prosperity even through she lost all her West Indian colonies to the British and although her merchant fleet was destroyed or paralysed. This can be explained by the fact that French manufacturers found a large outlet on the French dominated continent, while the agrarian reform and the abolition of internal trade barriers such as tariffs, by the revolution, were beginning to prove their beneficient effects. New manufactures and manufacturing processes sprang into existence and were encouraged by the government, while new chemical processes made possible to find adequate substitutes for such colonial products as cane sugar (for which a beet sugar was substituted) and indigo (Herold 1963).

Thus, the paradox of the Continental System was that while its two main protagonists, France and England prospered, third parties suffered, some to the point of ruin. The attempt by the two powers to influence these third parties influenced strategy. France, who was the offensive player, introduced in the first move the Continental System blockade, and then was bound in its next moves by it. Strategy had to follow the demands of the system, ie, it had to keep all European countries aligned behind it. Countries that did not want to apply it, like Holland, Germany (with its many states) Portugal, Spain, Austria, Denmark, Sweden, Prussia, Russia, had to be invaded, annexed, cowed and subjugated. In the long run all European countries faced a simple but difficult choice: either peace with Napoleon coupled with economic decline or ruin, or war against him in the hope of returning economic prosperity. In the end, most chose the second option.

Britain, secure behind her "wooden walls", her fleet, could adopt a more Fabian strategy, of waiting and reacting to Napoleon's moves, taking into account European dissatisfaction. Seapower gave her tactical flexibility. While Napoleon could not invade Britain, Britain could land expeditions on the periphery of the Continent (either by keeping Sicily out of Napoleon's reach, or later Lisbon behind the lines of Torres Vedras) creating new military fronts for him, and breaching the walls of the Continental System, allowing trade to flow in. Second, economically and financially strong, England could and did use its financial strength, translating it into military strength by granting subsidies to her Allies, Napoleon's enemies. Wellington's army for example had strong continents of

Portuguese and Spanish troops, whose financial cost was borne by Britain. Spanish regular revolutionary armies and guerillas were again supported by English financial grants. The same was true for Austria, in 1807-9, for Prussia in 1807, and for the Great Coalition of 1813-14. The armies fighting against Napoleon may have been Russian, Prussian, Austrian, Swedish, Portuguese, Spanish, Dutch, Saxon etc, but their means of finance were in great part English.

This was Napoleon's greatest misjudgment of his rival's economy: First Great Britain's economy, based on trade, industry and finance and to a much smaller degree on agriculture, was not weak, but inherently strong. Second, seapower allowed to Britain the freedom to trade with the rest of the world and evolve new trade partners, find alternative sources of supply and open new markets for her products. Even if the Continental System was "watertight" which as shown above it was not, and Britain was totally excluded from Europe, it still was free to trade with the rest of the world. As long as France was excluded from the seas, ie as long as France did not challenge England's naval supremacy, Napoleon was powerless to influence these developments.

Apart from the fact that Great Britain was able to act as the various anti-French coalitions treasurer, the expenses she bore for the navy attested her financial strength. Naval finance was 4,000,405 in 1791 (the Commons authorization for the naval budget), expenses for the navy were 4,491,665 pounds and accumulated naval debt 2,310,280. In 1813 the corresponding amounts had reached 21,212,280, 23,716,390 and 8,562,291, an increase of between 400-500% during the Napoleonic Wars. By 1815, the Commons had authorised a naval budget of 19,032,700 pounds, expenses had fallen to 16,366,445 and the naval public debt had already been reduced to 3,694,821 pounds. (Rodger, 2004). According to estimates, (O'Brien, 2004) total taxation in constant prices of the period 1451-7, had increased from less than 200,000 to about 5,500,000 during 1800-1810, doubling during the last twenty years of the period, ie from about 2,500,000 in 1790 to 5,500,000 by 1810 (O'Brien, 2004).

Government revenue came from taxes, the principal direct one being Land Tax levied on a fixed assessment since 1692, and indirect taxes, mainly excises. By 1797 real income from land was grossly underestimated and no other income was taxed at all. Pitt's government undertook a tax reform, taxing incomes and wealth according to some indicators of luxury consumption. It taxed horses, dogs, servants, carriages, coats of arms and even hair powder. By 1798, these self-assessed taxes were tripled and when

tax revenue at 3,5 Mio fell short of the estimated 7 Mio, then Pitt's government introduced the first direct income tax. During the war, 58% of the cost was met from taxation increasing to 70% between 1800 and 1815. The proportion of direct to indirect taxes exceeded one third. By comparison with the period of the American War of Independence, government debt increased by 300% but tax receipts in money terms increased by more than 500% reaching 20% of national income (Rodger, 2004).

On one point Napoleon was proved right in his views: Gold started to be short in Great Britain mainly because so much had been exported to subsidize Britain's allies, or spent on importing grain after the bad harvest of 1795-6. The Bank of England was forced to suspend the convertibility of its notes. According to mercantilistic views, this should have been equated with Britain becoming poorer and nearing bankruptcy. Here Napoleon erred: Britain was able to use its strong financial institutions, capital markets and banking system. The Bank of England continued to circulate non-convestible notes (up until 1822) managing the supply with prudence. Neither the credit of the bank nor the value of the currency was seriously damaged. Going off the gold standard allowed the British economy during the course of the wars to be gently reflated, ensuring maximum production and employment. In fact, during the Napoleonic period, the British government undertook a policy that can be interpreted in today's, terminology as Keynesian: A combination of cautious expansionist monetary and fiscal policies, the first implemented by the issue of non convertille notes by the Bank of England, and the second by the finance of public debt (the difference of budget authorizations and expenses) through bond issues on London's capital market.

As a matter of fact, the Victualling Board was the largest single purchaser on the London markets for agricultural products. It followed a policy of managing the markets so as to encourage the growth of large firms while at the same time promoting competition. This influenced the growth of a sophisticated and integrated national and international agricultural market. The British economy was characterized by producers, even small ones in remote parts, who were accustomed to serving a national market, exporting their goods, usually by coastal shipping to London, being paid by bills which they could discount locally, investing their savings in the financial markets. Long before the industrial revolution began, a financial, institutional, commercial and agricultural revolution had taken place, which

made the British economy the most sophisticated in the world, and which linked internal commerce and production to international trade flows. This economic sophistication gave to Britain a distinctive advantage over France (Halkos - Kyriazis, 2005). The geography of the British Isles gave most districts access to coastal shipping and the efficiency of water transport, costing at most about one-twentieth of road transport, made possible a network that integrated local markets into a single national and then international one. France was a bigger country with a larger population but it lacked an integraded economy. Its great commercial ports were linked to foreign countries rather than the interior of France. France lacked a network that would integrate regional markets into a national one. French trade and commerce was mainly with its colonies, not within the country itself, as was in part the case with British seaborne trade. The French West Indian colonies, generated two-thirds of France's trade and shipping. First among them Saint-Dominique generated two-fifths of French foreign trade and two-thirds of its deep-sea shipping (Rodger 2004).

Thus we arrive at a very interesting conclusion concerning the relation of seapower, trade patterns and political structure. Britain, the principal seapower, was characterised by a decentralised political system, where local political bodies had substantial autonomy and decision making powers, and at the same time had an advanced market economy, where the whole country was integrated into one market, served by a network of shipping for internal and foreign trade. France, mainly a landpower, was characterised by a centralized political system, where local political bodies did either not exist, or at most had limited autonomy in decision making and had to execute the decisions taken and imposed upon them at the center (As stated above, the problem of executing the decisions was different from taking the decisions). On the other hand, France was still economically not integrated to the same degree as Britain into a single market. Regional markets were still to a higher or lesser degree isolated from one another. Seapower and shipping brought down in the case of Britain transaction costs of all kinds, and thus promoted a relatively efficient global market. Lacking seapower and sufficient shipping, France had higher transaction costs, that inhibited the creation of an integrated, efficient global market.

Even assuming that Britain was excluded from trade with Europe through an application of the Continental System, she could trade due to her maritime supremacy with the rest of the world. Although estimated trade statistics for the

period have to be approached with caution, it can be estimated that over two thirds of British trade by the end of the 18th century was not with Europe, but with the "rest of the world", in which the British colonies are included. By 1798 for example 57% of British exports went to the Americas (Rodger 2004). British ships and British seamen in ever-growing numbers still earned their living in the transatlantic trades. British merchants offered American consumers the goods they wanted and American exporters the prices and credit terms they needed.

In the long-run the Continental System was beneficial to Britain, because it enabled her to substitute her products, trade and shipping in place of that of her rivals, France, the Netherlands, Spain and Denmark. During the wars, Britain managed to conquer all French, Dutch and the few Danish colonies, while the Portuguese colonies were always open to British trade, and the Spanish ones were first obliged to trade with Britain, being to a high degree cut off from Spain, and then, after the Spanish anti-French revolution, they were willing trade partners. Simply put, even if Britain were to be excluded from European, trade, it could freely trade with the USA, Canada, Latin America, Africa, India, China, Indonesia (and the important Dutch spice islands), the Ottoman Empire and the other Asian countries. It could and did develop alternative sources of supply in cases were old ones were threatened by the embargo. For example, the navy depended on Baltic imports of timber and naval supplies for its ships. When this source was closed temporarily after 1807, the navy started building ships using tropical woods (mainly teak) in shipyards in India. In the beginning this possibly led to an increase in cost, but these ships had a longer service-life, so that in the end this change of supply was cost-efficient. Crouzet (1989) estimates that British exports grew at mean rates of growth per year of 3,1%, re-exports at 2,3% and imports at 1,2% during 1802-1814.

The Napoelonic Wars coincided partly in time with the Industrial Revolution, which makes the economic effects of the wars on the British economy somewhat difficult to distinguish clearly. Among others, the emergence of the factory system and the merchanisation of cotton spinning had been taking place, as well as canal construction and accelerating population growth. Due to technology advances and mechanization, the composition of British exports underwent a major change during the wars: Exports of cotton products grew much faster than those of other goods, their share of total exports' value increasing from 6% in 1784-6 to 40% in 1814-16.

Inflation increased by 90% from 1790 to 1813, ie an average rate of inflation of about 3%. Depreciation of the inconvertible pound was limited to 41% in relation to silver by 1813. Monetary policy by the Bank of England combining a generous discount policy on notes issues, floating of public debt, inconvertibility of the notes and floating exchange rates during 1797-1821 helped to safe-guard confidence in the currency which was almost unimpaired, in total contrast to the situation of the French assignats (Crouzet, 1989).

Fiscal policy had a "modern" character of redistribution in favour of profits and investment, since war finance imposed heavy custom or excise duties that fell mainly on consumption. (Crouzet, 1989).

The average ratio of productive investment remained fairly stable during the wars. High government borrowing did not produce a "crowding out" of investment, because government loans were subscribed thanks to an increase in total savings. The "savers", ie the prosperous parts of the population displayed a higher propensity to save and to lend to the government. War expenditure gave a sharp (Keynesian) stimulus to an economy which had unemployed resources, national product was increased and to some extend the war paid for itself (O'Brien and Crouzet 1989).

The developments following Britain's transformation into a seapower in the 17th century established the financial institutions and the changed economic structure, which made possible the British war effort. The British managed to pay on a per head basis and in wheat equivalent three times more taxes than the French. This again demonstrates clearly the superiority of the British economic system.

Even Denmark, one of England's most dedicated enemies after the battle of Copenhagen, had to face reality and evade the Continental System, in order to allow her ships to bring much needed foodstuffs to Norway, then part of the Danish state.

Thus, in the long run, while the Continental System brought ruin to France's allies, it brought prosperity through world trade domination to Great Britain.

5. A game theory formulation of strategy

The French revolutionary and Napoleonic Wars may be analysed in a

game theoretic context of strategy, with a basic difference from usual games, in that the two players, England and France start with different and unequal conditions. This initial inequality shapes the strategic choices of the two players: In a game with a short run time horizon, France, the land locked player, can adopt only a strategy of indirect attack against her rival, England, the naval player, because she is unable to confront her directly. In historic terms this attempt by France took two forms: First the Egyptian expedition and then the Continental System. Both ended in dismal failure, which in the end brought down the French state itself. In game theory terms, both strategic options are worse for France than a strategy of doing nothing, ie France should adopt a strategy of preserving the status quo, peace and non-provocation of Great Britain. All other strategic choices lead to a worse outcome than the initial situation. If the outcome of strategy one, preserving the status quo, is denominated as S_1, and the outcomes of strategies of indirect attack are denominated as S_2, then S1 dominates S_2, ie $S_1 > S_2$.

The opposite is true for the outcomes of the naval player, Great Britain. If the land locked player decides to start war, in the end the outcome is favorable for the seapower, ie for Great Britain S_2 is better than S_1, $S_2 > S_1$. In reality, the Peace of Vienna in 1815 gave to Great Britain undisputed world leadership for almost a century, to the outbreak of World War I, and economic leadership, combined with her industrial revolution that lasted to the end of the 19th century. Only in the last decades of the 19th century did the US GDP per head overtake the British one.

If the game is played with a long time horizon, then the land player has a viable alternative strategy that may offer a possibility (but not a guarantee) of success, which is to become itself a seapower and challenge the seapower on its own terms. This was the strategic choice undertaken successfully by Ancient Athens when facing the Persian invasion, the Peloponnesian League and Sparta when facing Athens during the Peloponnesian War, and Rome when facing Carthage during the first Punic War.

After Trafalgar and during the Continental System, Napoleon did attempt to transform France into a seapower in the sense of trying to build a fleet strong enough to challenge British supremacy. According to recent research this effort should not be taken too seriously, because "In fact much of the building effort, like all Napoleon's naval plans, was based on

fantasy". (Rodger 2004, p. 562). Hastily constructed of green timber to obsolete designs, many of these ships were rotten before they were ever commissioned. Shipwrights were scarce and poorly paid which resulted in poor building quality. But even more important perhaps morale and discipline remained very poor, especially among officers. As stated before, it takes years to build ships but at least decades to build an efficient navy. Napoleon's Continental System and its strategic results prevented France from enjoying the time needed to become an efficient seapower.

The institutional theory of growth (Kyriazis 2005) in relation to the concept of path–dependence (Arthur 1989, David 1994, and 1985) shows that countries are bound by their historic past, by the norms, customs and institutions developed during centuries. These norms, customs and institutions shape also the future, letting a country develops along one historic path to the exclusion of others. Path–dependence is strong, but can be broken. Usually, the probability of this happening is greater, when a country faces a very great external challenge that makes such a change a matter of survival. This was the historic situation of Ancient Athens facing Persian invasion prior to 480 B.C., England's facing Spanish invasion prior to 1588 and the United Provinces facing Spanish occupation during their revolution prior and after 1568.

The changing economic structure of Great Britain enabled it also to mobilize a higher percentage of it's population for the war effort than other countries, a situation similar to that of the United Dutch Provinces during the 17th century (Kyriazis 2005).

The population of England and Wales increased by 2,146,000 inhabitants, from about 5,5 Mio in 1791 to about 7,7 Mio in 1811. At the end of the wars, about 500.000 men were serving in the army and the navy, corresponding to about 10% of men in the age group 18-45, or almost 5% of total population of about 10 Mio, including Scotland. Astonishingly, there is no evidence of a widespread shortage of labour during the wars (Crouzet 1989).

France on the other hand did not manage to break historic path – dependence and instead of a land based centralized and autocratic country, to become a more democratic seapower. The French revolution itself degenerated very fast into the Napoleonic autocratic regime, which from the point of view of decision making powers was more concentrated in a few hands, Napoleon's and his very close collaborators, than the French kingship it superceded. From the point of view of institutional development

and government, the Napoleonic empire was a retrogression, which stood in stack contrast with institutional developments in Great Britain.

Great Britain during this period is a very good example that vindicates the extended Aristotelian thesis. Seapower was linked with institutional development both in the political area in the form of progressive–evolutionary democracy, and in the economic area, in the form of the evolution of markets and efficient financial institutions like the stock exchange, capital markets, banks, joint stock companies, insurance, trade, industry and agriculture.

NOTES

1. This is an important point: The forms of government should be compared across countries during the same historic periods and not with hindsight, to what we understand as democracy today. Thus, Venice and the United Provinces, both called themselves Republics, although by today's standards they would qualify rather as oligarchies, ruled by their merchant classes. But again, both Venice and the United Provinces were at that time more democratic than absolutist states like Russia, Prussia or France.

2. Using for example as a measure of capital intensity guns per men or outlays other than payment to crews and men in armies. For estimates, see Halkos–Kyriazis (2005).

3. For example, deep sea fishing for herring in the Northern Sea, or whaling, but even more to discover and exploit spices.

4. Institutions affect the performance of the economy by their effect on the costs of exchange and production. Along with the technology employed their operation determines the transaction and transformation costs, i.e. they enter into the cost function in an economy (North, 1990, p. 5 & 6).

5. It is striking that although institutional creation and change shape the way societies evolve through time, current economic theory does not show any appreciation to their role in economic performance, because there has not been yet any analytical framework to integrate any institutional analysis into economics and economic history (Gemtos,

2001, ch 1; Hodgson, 1988, ch. 1 &2; North, 1990, ch. 1)

6. Reflecting upon the rise and fall of ancient empires during his garrison days at Auxonne as a lieutenant, he reached the following conclusion: "Experience nearby always proves that the maritime state will be defeated because war destroys its commerce and gradually exhausts it whereas its opponents are toughened and strengthened" (Herold, 1963, p. 208). The influential American admiral Mahan reached the opposite conclusion a century later, because the outcome of Napoleon's struggle with England supplied him with the most forceful argument conceivable in favor of the supremacy of sea power (Mahan, 1890, 1980).

7. Bagnall (2002) goes as far as to state that as an example of innovation that led to a precipitous reversal of battlefield superiority, the corvus outclassed all subsequent development such as gunpowder, radar, submarines, the tank, air power and electronic warfare.

8. Rodger (2004, p. 442) calls them "primitive".

9. According to newer theoretic contributions (Kyriazis 2005, Kyriazis – Zouboulakis 2004 and Halkos–Kyriazis 2005), part of the explanation of the Industrial Revolution taking place in Great Britain and the United Provinces, was that sea power helped these two countries to create the institutional framework and conditions that were propitious for the Industrial Revolution. This is something that the present paper also supports.

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THE CONCEPTUAL ROOTS OF WORK EFFORT IN PRE–CLASSICAL AND CLASSICAL ECONOMIC THOUGHT*

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Abstract

In modern literature, the concept of work effort is used as an additional explanation of involuntary unemployment. In particular, it is assumed that higher wages have a positive effect on work effort and this is the fundamental point of the efficiency wage models of involuntary unemployment. However, as it is often the case, the concept of the workers' effort was not new but it was an idea that can be found in the works of a number of pre-classical and classical economists. This paper discusses the conceptual roots of the idea from the late 17th until the middle of the 19th centuries. For instance, there is evidence of the connection between wages, work effort and consumption in the works of North, Hume, Steuart, Smith, Young, Crumpe, Ricardo, Senior, McCulloch, Babbage, Longfield, J.S. Mill and others. The paper also assesses the similarities and differences of their views with current approaches to work effort.

JEL classification: B11, B12, J2.
Keywords: Work Effort, Wage Rate, Pre–classical, classical thought.

1. Introduction

In the last decades of the twentieth century, there was an increase of interest in the idea of work effort. The basic theoretical point was that

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higher wages have a positive effect on worker's work effort. More specifically, this concept was used by many economists as an additional explanation of involuntary unemployment. It was the starting theoretical point in a variety of models such as, the efficiency wage model, the partial-gift- exchange model and the shirking model. It has also been used as an argument in the trade union utility function. However, as it is often the case, the concepts of the workers' effort, wages and consumption were not new but can be found in the works of a number of pre-classical and classical economists. There are numerous examples in the history of economic thought where an idea reappears after a long break, quite often in a new theoretical framework. Smith's wage compensating differentials, Ricardian equivalence and underconsumption theories are indicative cases. Thus, the main aim of this paper is twofold: first to discuss the conceptual roots of work effort and its various dimensions from the late 17th until the mind of 19th centuries, and second to relate such views with modern ideas and analysis. It has to be noted however, that is not the intension of the paper to examine in detail the theoretical context in which these authors conceived and developed the relationship between the wage rate, work effort and consumption (for examples of such discussions, see Brewer, 1998; Marshall, 2000; Fiaschi and Signorino, 2003;)

In this light, the first section of the paper provides an overview of the current usage of the issue of the positive effect of wage rate on work effort. It concentrates on the efficiency wage model, the shirking model, the partial- gift-exchange model and on the trade union objective function. The next section examines the presence of this idea in pre-classical economists such as North, Hume and Steuart. Section four concentrates in classical economic thought. The connection between wages and work effort can be found in the works of Smith, Young, Crumpe, Ricardo, Senior, McCulloch, Babbage, Longfield, J.S. Mill and others. Finally, a concluding section attempts to establish the similarities and differences with respect to the modern uses of work effort.

2. Work effort in modern analysis

The idea that higher wages have a positive effect on work effort appeared in

modern literature in the early 1970's. For instance, Leibenstein analysed work effort in terms of four components, such as "the choice of activities which compose the effort; the pace at which each activity is carried out per unit of time; the quality of each activity; the time pattern and length of activity" (1976, pp. 98, 101–2, 114–5; see also 1979, p. 130). In another work (1978, pp. 63–4), he argued that higher wage rate implies higher effort not only because of material but also of psychological well being of individuals.[1]

The idea of work effort started gaining more attention in the context of the theoretical attempts to explain involuntary unemployment. In particular, many theorists wanted to tackle the question why many firms are willing to pay non-competitive wages which might be seen as an important cause of labour market clearance failure. The efficiency wage models of involuntary unemployment had as a starting point a production function of the following form:

$$Q= sF(e(w)N) \qquad (1)$$

Where w is the real wage rate, N is the number of employees, s reflects technological shifts and e is effort per worker. Given this, firms will offer a w^* rate of wage which satisfies the condition that the elasticity of effort with respect to the wage is unity. This implies that the marginal product of labour will be different than the standard one and will be equal to w^* (the efficiency wage). The consequence of this is the existence of involuntary unemployment (for the basic papers, see Stiglitz, 1976; Solow, 1979; Yellen, 1984).

The importance of the efficiency wage hypothesis cannot be underestimated. Its extensions have been used in explaining a wide range of labour market phenomena such as: dual labour markets, real-wage rigidity, the existence of wage differentials and discrimination among workers with different observable characteristics. [2]

In relation to the above, there have been a number of models that provide some more microeconomic foundations of the efficiency wage theory and which made use of the idea of work effort. One of the most well known of these models is the shirking model. The basic tenet of this model is that the payment of wages in excess of market clearing, pushes workers to work hard in order not to lose their jobs. This implies that high wages raise workers' effort level. In other words, by raising wages, firms may make the cost of job loss larger and thus encourage good performance at work (see Krueger and Summers,1988;

Shapiro and Stiglitz, 1984). In addition, many versions of the shirking models assume that firms cannot monitor perfectly the workers' effort.

The work effort idea has also been used in connection with the concept of social norm. More specifically, the starting point in the partial-gift-exchange-models is that each worker's effort level depends on the work norms of his/her group. Thus, a reduction of wages by a given firm may be considered unfair by the workers, leading them to supply less effort (Akerlof, 1984; Akerlof and Yellen, 1990). This can result in real wage rigidity and therefore to a non-market clearing situation.

Workers' observed effort has also been used in labour economics literature. Usually, a union worker's utility function is written as:

$$U= u(w,e) \qquad\qquad (2)$$

The utility function is increasing in wages but decreasing in effort. Relation (2) is substituted in the union objective function which is maximized subject to the firm's profit function. The bargain provides a solution for union wages and effort as a function of a number of exogenous variables such as product market structure, the level of employment and union power (see for instance Layard, Nickell and Jackman, 1991 and Booth, 1995).

In general, the bulk of the literature connects high work effort level with increasing wages. It is implicitly assumed that the fundamental motive to work harder has to do with higher wages. As we shall see, many pre-classical and classical economists had the same idea including its logical consequence that higher wages are desired because they imply higher consumption level. Thus, they emphasized the positive effect of a higher material living on the work effort of individuals measured by the extension of working hours and/or by increasing effort in fixed time.

3. Late pre-Classical thought

During the phase of the late mercantilism and in particular in the last decades of the 17th and in the early decades of the 18th century, one can discern some authors who argued for the idea of the "economy of high wages" (Heckscher 1931, vol. II, p. 170). The basic point of this stream of thought was that by increasing real wages, the consumption level, the

natural condition and strength of the labourers would be advanced and thus their work effort would be increased too (see Furniss, 1920, pp. 179-80; Coats, 1958, pp. 37-41, 45; Perrotta, 1997).[3]

More specifically, North emphasized that through the availability of luxury goods the work effort (in terms of working time and rate of effort) of individuals is increased. As he argued: "The main spur to Trade, or rather to Industry and Ingenuity, is the exorbitant Appetites of Men, which they will take pains to gratifie, and so be disposed to work, when nothing else will incline them to it; for did Men content themselves with bare Necessaries, we should have a poor World" (1691, p. 528). Thus, "Countries which have sumptuary Laws, are generally poor; for when Men by those Laws are confind to narrower Expence than otherwise they would be, they are at the same time discouraged from the Industry and Ingenuity which they would have employed in obtaining wherewithal to support them, in the full latitude of Expense they desire" (Ibid., p. 529).

Some decades later, Mandeville (1724, pp. 146,154) recognized that by increasing the wage rate, the consumption of comforts and luxuries, through a bandwagon effect, would be increased. In a similar tone, Defoe arguing that the chance for betterment of one's material living inspires his work (1728, p. 122), warned that "poverty is the fountain of all manner of idleness" (Ibid., p. 123; see also Ibid., p. 127).

The philosopher Berkeley (1735–7, query 542) thought that the volume of necessary and conveniences goods make up the wealth of a nation. Then, he argued that men by having fulfilled their material wants, voluntarily extent their work effort (rather in terms of working time) to other production activities in order to advance their living standard. As he put it: "Whether people who had provided themselves with the necessaries of life in good plenty would not soon extend their industry to new arts and new branches of commerce?" (1735–7, query 63; see also Hutchison, 1953-4, p. 61). Similarly, Hume claimed that by increasing the variety and production of non-basic goods, the rate of work effort is increased and thus does the production level. As he put it "It is a violent method, and in most cases impracticable, to oblige the labourer to toil, in order to raise from the land more than what subsists himself and family. Furnish him with manufactures and commodities, and he will do it for himself" (ed. 1970, "Of Commerce", p. 14).

Sir James Steuart, connects work effort to the satisfaction of human

wants. As he writes: "A man must first exist, before he can feel want; he must want, that is, desire, before he will demand; and he must demand, before he can receive" (1767, p. 150). Under this "aspiration effect" (see Eagly, 1961) and the supposition that "there are no bounds to the consumption" of luxury goods (1767, p. 139) and the "desire of the rich" (1767, p. 310), he described the path of economic development (1767, pp. 151, 156-7, 357).[4] He also held that the increase of work effort is more evident when labourers are paid "by the piece" than when they are paid "at a regular rate". (1767, p. 169). Furthermore, he justified a higher than the subsistence wage determined in biological terms on the grounds of "an extraordinary dexterity in any art … [and].… the difficulty of acquiring the dexterity requisite, resulting both from the time and expense of apprenticeship" (1767, pp. 274-5).[5]

Steuart emphasized the following positive effects of luxury consumption: the idle rich consumers by spending their wealth in luxury consumption goods, would increase the demand for labour, and as a result the level of production would be augmented (Steuart 1767, p. 46; see also Karayiannis, 1988, p. 34). An increase of luxury consumption, as he recognized (1767, pp. 60-1, 244, 309) is not only the effect of pleasure but furthermore the effect of imitation and of conspicuous consumption behavior which is "formed by the taste for dissipation, and supported by habit, fashion, and a love of expense" (1767, p. 243).

However he pointed out that luxury consumption might have a negative effect if the labourers and entrepreneurs accustomed to a high living standard increase their reward and "consolidated" it into the cost of production (1767, pp. 193, 286, 357; see also Karayiannis, 1991, p. 182).[6] In such case, the country would lose its advantage in foreign trade: "in consequence of an habitually greater expense in living, which implies an augmentation of wages; this country may thereby lose all the advantages it had from the low price and superior quality of its wool" (1767, p. 239; see also Ibid., p. 248). Furthermore, the statesman has as a duty to prevent such a situation (1767, pp. 250–1).

4. Classical thought

The above views of the positive impact of the wage rate and the consumption pattern on work effort can also be found in Classical

analysis.[7] More specifically, Smith was one of the leading figures who connected wages with the work effort of individuals. As he argued: "The liberal reward of labour, as it encourages the propagation, so it increases the industry of the common people. The wages of labour are the encouragement of industry, which, like every other human quality, improves in proportion to the encouragement it receives" (1776, p. 99). He also explained (1776, pp. 389,684) the higher productivity of tenants compared with slaves along these lines. Moreover, he explained variations in the rate of wages in terms of "hardship or ingenuity" (1776, p. 48).[8]

The thesis of Hume, Steuart and Smith that the consumption of non-basic goods (mostly luxury goods) would stimulate the rate of work effort, the demand for labour and the wealth of a nation, was also followed by Arthur Young (1774, pp. 52–3). Furthermore, Benjamin Franklin followed the same path by pointing out that the existence of luxury goods is a motive for increasing work effort both in working hours and working effort. As he writes: "Is not the hope of being one day able to purchase and enjoy luxuries a great spur to labor and industry? May not luxury, therefore, produce more than it consumes, if without such a spur people would be, as they are naturally enough inclined to be, lazy and indolent?" (1784, pp. 448-9). In addition, he stressed that by increasing luxury consumption the rate of employment is also increased (Ibid., p. 450).

Samuel Crumpe also supports the idea that through the stimulation of increased consumption, the work effort of individual is increased. By distinguishing between basic and non-basic goods, he argued that the desire for consuming the second kind of goods, the level of economic growth would be advanced. As he noticed "Two causes ... exist, which principally rouse man from that indolence and inactivity, to which he is naturally prone. First, the original necessity of food and raiment; and secondly, the desire of enjoying the comforts and conveniences introduced by civilization" (1793, p. 13). By recognizing the imitation effect in consumption (Ibid., p. 20; see also pp. 25, 27), he suggested "a taste for the comforts and conveniences of life" to be "universally diffused among a people", in order to enforce "the principal incentives to assiduous, industrious, and systematic labour" (Ibid., p. 14; see also p. 24). Through such an increase in work effort (in terms of time and energy) the productivity would increase and the wealth of nation would be augmented (Ibid., pp. 41,45).

Ricardo recognized that the way to increase the work effort of individuals, or to "stimulate exertion", in the underdeveloped economies, is "to create new wants, and to implant new tastes" (1817, p. 100, ft). Senior also claimed that the desire for increase the material welfare of individuals would promote their work effort and productivity and furthermore "the endeavour to accumulate the means of future subsistence and enjoyment, is, to the mass of mankind, the general source of moral improvement" (1827, p. 12). Thus, the institution of private property (and mostly its security, Ibid., p. 14) and the wealth motive of individuals (Ibid., p. 35) not only increase material welfare but also their moral improvement.[9]

On similar grounds, McCulloch declared that "the best interests of society requires that the rate of wages should be kept at a high elevation" (1825, p. 335), as the demand of new and better goods would be increased and so the rate of work effort, production and economic growth (1825, pp. 347, 494, 498). The main motive for an increased work effort and dexterity of individuals for McCulloch (1825, pp. 492, 497) is "to improve their conditions"- an argument very common among the members of the Classical School. More specifically, Samuel Read (1829, pp. 143–4) argued that individuals gradually advance their material consumption and happiness as their productive capacity increases. As he put it:

"All men naturally desire to possess and enjoy wealth and to better their condition; in other words, all men naturally desire to possess and enjoy the necessaries, conveniences, and luxuries of life. Food, clothes, and longing, of some sort or other, are absolutely necessary. There are first desired in abundance, then of better quality; and, as society advances, and wealth, and knowledge, and civilization increase, the desire of improvement increases still more;"

Whately argued (1832, p. 51) that the level and goods included in a consumption pattern is socially determined. Therefore, "an individual man is called luxurious, in comparison with other men, of the same community and in the same walk of life with himself" (1832, p. 53). Such behaviour has as a consequence the emergence of the motive for emulation by which the work effort is increased. As he claimed: "As wealth increased, the continued stimulus of emulation would make each man strive to surpass, or at least not fall below, his neighbours" (1832, p. 145). And, when emulation is "duly controlled, and directed to the best objects, though it does not of itself

furnish the noblest and purest motive, it is a useful and honourable ally of virtue" (1832, p. 146).[10] Thus, "the effort of each man, with a view to his own credit, to rise, or at least not to sink, in society, causes, when it becomes general, the whole Society to rise in wealth" (1832, p. 147). Thus, Whately (see also 1832, p. 147) like Senior after him (see Karayiannis, 2001) connects the cause of consumption emulation with the effect of an increase in work effort and production (see also Drakopoulos and Karayiannis, 2004).

The argument that the possibility of increasing someone's material situation would increase work effort in terms of energy and ingenuity, is reinforced by Babbage and in the case of technological improvements. He holds that:

"The same motive which urges a man to activity will become additionally powerful, when he finds his comforts procured with diminished labour; and in such circumstances, it is probable, that many would employ the time thus redeemed in contriving new tools for other branches of their occupations. He who has habitually worked ten hours a day, will employ the half hour saved by the new machine in gratifying some other want; and as each new machine adds to these gratifications, new luxuries will open to his view, which continued enjoyment will as surely render necessary to his happiness" (1832, p. 335).

Moreover, Babbage, recognized a mechanism of innovative goods promotion through the extension of luxury consumption in the lower classes of society (Karayiannis, 2005). As he argued: "a taste for luxuries is propagated downwards in society, and, after a short period, the numbers who have acquired new wants become sufficient to excite the ingenuity of the manufacturer to reduce the cost of supplying them, whilst he is himself benefited by the extended scale of demand» (1832, p. 149).

Longfield advances the argument that "the wages of the labourer depend upon the expense of his maintenance and usual style of his living, instead of his expenses and his mode of living depending pretty much upon his wage" (1834, p. 203). He also believes that the "love for variety" in consumption would promote the rate of work effort and dexterity of individuals (1834, p. 44). As he states:

"I do not deny that it is for many reasons desirable that the labourer should be accustomed to think a certain degree of comfort indispensable. Such habits, such wishes on his part, if not the cause of his receiving suitable wages,

are at least the effect of his prosperity, and therefore imply that his situation is much as we should all desire to be. Such wishes and habits may even lead to a continuance of his prosperity, by inducing him to make extraordinary exertions, rather than forego those comforts and decencies which he has been used to consider indispensable to his happiness" (1834, pp. 205–6).

Samuel Newman emphasized the positive effect of the possibility of betterment of material condition as a source of work effort. As he claimed "The hope then of bettering his condition, is before the laborer. He is prompted to continued and patient effort, that he may acquire property, and have around him an abundance of the comforts and conveniences of life, and thus be held in respect by others" (1835, p. 59).

In the same tone, J.S.Mill argued that the availability of luxury goods for labourers increases their productiveness, namely the labourers "have an opportunity given them of acquiring comforts and luxuries. …They are thus incited to increase the productiveness of their industry" (1848, p. 119). He concentrated his explanation of an increased work effort produced by an increased reward on labourer's energy and ingenuity, as he noticed that "it is a truism to assert, that labour extorted by fear of punishment is inefficient and unproductive" (1848, p. 251; see also p. 253).

The majority of Classical authors stressed that a higher wage rate and the resulting higher living standard would function as a stimulus to workers to increase their effort. By such a 'mechanism" productivity would be increased and a higher economic and social growth would be attained. It should be noticed however, that the meaning of the work effort in classical (and pre-classical) thought is not always entirely clear. It seems that there is no clear distinction between extending working time and work intensity.

5. Conclusions

The above discussion might have provided some interesting insights concerning the concept of the work effort in the history of economic thought. First of all, one can discern a clear connection in pre-classical and classical thought between wage level and effort. Although as was stated there are examples of a negative relationship between wages and work effort, almost all of the authors examined in this paper favour a positive

link between the two. More specifically, the connection between wages and effort is made through the concept of increased consumption level which is the effect of increased wages. In this sense, it is quite similar with modern ideas regarding work effort and wages. The pre-classical writers argued that when the provision of basic goods is met, then the demand for luxury goods will increase and this raises effort (i.e North, Hume, Steuart). The basic line of this argument can also be found in many classical economists. The increasing need for non-basic goods and variety in consumption is seen as a driving force for increased work effort. (Smith, Young, Crumpe, Senior, Ricardo, Mculloch, Longfield, Newman). Smith also pointed out that the need for social distinction increases effort. In addition, Whately believes that the consumption pattern is socially determined and thus the continuous stimulus of consumption emulation also has a positive effect on work effort. One can note here the similarity of this idea with Akerlof's argument concerning the link between work norms and work effort.

It was shown that many pre-classical and classical economists saw the increased work effort as beneficial to the economy since it raises production and productivity and thus increases economic growth. This is the main reason of the pre-classical and classical arguments in favour of higher wage. However, they did not make the modern connection between work effort and equilibrium unemployment since this was considered to be impossible (The possible exception is Steuart who argued that the consolidation of the higher wages in the value of goods might decrease exports and thus increase unemployment.) As was seen, the focus of the modern analysis in using the concept of work is to provide an additional theoretical explanation for equilibrium unemployment. One can argue that in this respect the two approaches differ. Furthermore, an important point of the modern theories is that it is not possible to observe and reward effort directly. The pre-classical and classical authors did not consider this kind of informational asymmetries. In addition, it can be argued that many of the pre-classical and classical quotations can also be viewed from a supply of labour hours perspective. However, it is clear that the "modern" idea of the connection between work effort and wages was not new but its conceptual roots can be found in the above mentioned authors.

NOTES

1. The positive effect of the wage rate on work effort had also been empirically justified on psychological grounds (see for instance, Vroom, 1964, p. 252–60).

2. See for example Malcolmson 1981, Stiglitz 1986, Krueger and Summers 1988, McNabb and Ryan 1990. For a general survey of how the efficiency wage hypothesis can shed light to many labour market issues see Bulow and Summers (1986).

3. However, during mercantilism there were some authors who argued that there is a negative effect of the rate of wage on work effort. For example, T. Mun (1664, p. 74) claimed that "as plenty and power doe make a nation vicious and improvided, so penury and want doe make a people wise and industrious". Such a view was shared by some authors of the 18th century such as Gee (1729, p. 38), Richardson (1744, p. 201) and others such as Manley, Child, Pollefxen, etc (see Furniss, 1920, pp. 118-125; Coats, 1958, pp. 35-6; Garrary, 1978, p. 39). The champion of this thesis was Tucker (1750, pp. 31-2) who claimed that "the men are as bad as can be described; who become vicious, more indigent and idle, in proportion to the advance of wages, and the cheapness of provisions: Great numbers of both sexes never working at all, while they have any thing to spend upon their vices". A policy suggested by some authors (e.g. Tucker, 1750, pp. 32,36-8; Temple, 1758, pp. 55, 133-4; see also Seligman, 1899, pp. 48-51; Kennedy, 1913, pp. 116-7) for decreasing the real wage rate and increasing work effort, was by the imposition of a high tax upon necessary goods. They believed that through such a policy, the cost of production would be decreased and this would strengthen the competitive advantage of the country in foreign trade. This thesis may be epitomized by the words of Petty (1687, p. 172): "the high wages ... is another burden upon our foreign trade".

4. Steuart, in particular emphasized (1767, pp. 163, 166–7) the role of merchants in importing luxury goods and spreading the taste for the consumption of such goods.

5. These qualitative characteristics of a productive labourer were also

recognized by Cantillon (1755, pp. 19-23) who mentioned specific labourers' qualities such as "the time lost in learning", "the cost and risk incurred", "ingenuity and industry" and "skill". Similarly , Harris (1757, p. 17) emphasized training time, risk, dexterity and skill as elements which regulate "the prices of labour and services of different sorts" (Ibid., p. 17).

6. A similar analysis of the positive and negative effects of luxury consumption by labourers was also advanced by Harris (1757, pp. 366–7).

7. However, there were some voices in the period who argued that the rate of work effort might be increased when the real wage rate is diminished, mainly by the imposition of taxes on wages and/or the price of necessary goods (see e.g. Craig, 1821, pp. 45-6).

8. Similarly Turgot (1766, p. 146) had stressed that "more skilful, more energetic" labourer receives a differential wage rate.

9. Richard Whately the Archbishop of Dublin criticized those moralists who were against the endeavour of individuals to increase their wealth and to better their material conditions (1832, pp. 40–2).

10. It was a generally accepted thesis among classicists (see. e.g. Torrens, 1834, p. 26; Ramsay, 1836, pp. 125–6) that the motive of workers to better their material position might restrain their natural inclination for multiplication.

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DEMAND MANAGEMENT AND INTEGRATED DELIVERY SYSTEMS: THE CASE OF PRIMARY HEALTHCARE SERVICES IN GREECE

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Abstract

Health Care services have undergone through major changes during the last 20 years in the US and Europe, primarily due to rising costs of healthcare, unrealistic public policies and mismanagement of resources available. In this paper we describe the structure and the characteristics of the healthcare services system in Greece and assess the policies that are applied by Public Health Insurance Organizations for such services to be effective. In addition, we present the characteristics of primary healthcare services demand management and compare the case of Greece with that in other countries. Finally, we propose the implementation of an Integrated Delivery System (IDS), which utilizes advanced Information Systems and Communications technology, in order to manage effectively and efficiently the primary healthcare services demand. The implementation of IDS was mainly motivated by the fact that Public Health Insurance Organizations in Greece still are not capable to intervene and/or control primary healthcare services demand. The proposed IDS system uses principles and tools from the field of Information Resources Planning and is adapted to Greece's Health Insurance public strategy and policy.

JEL classification: I10, I18, I11.
Keywords: Primary Health Care, Demand Management, IDS, Health Economics.

1. Introduction

The healthcare sector in the developed countries is coming through fundamental changes at this period. The increasing demand within the fiscal limits creates the need for efficiency management and control of the resources directed to the healthcare sector.

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Specifically in Greece, the healthcare delivery system has experienced major changes over the last two decades, the legislation of the National Health System (ESY) being its determinative point of reference. Nevertheless the people responsible for the healthcare policy usually struggle with the significantly complicated structure of the system, with many people and strong (economic and other) interests being involved. Furthermore, the changes in the biomedical technology and medicine practice, as well as the population ageing, have lead to a dramatically increased healthcare services demand. Therefore the experts have a continual and increasing need of the means that will help them precisely evaluate and quantify the consequences of the available interventions and changes. An Important issue to the planning policy is the primary healthcare services demand management.

In this article we attempt to describe the policies applied in Greece by the Public Insurance Organizations in order a) to succeed an effective management and control over these policies and b) to compare with equivalent ones of other countries.

2. The Healthcare System in a Crisis

During the last twenty years, all over the world, every healthcare system been developed during that time, was not only unable to completely cover the health needs of the individuals and the society, but led into a continually increasing cost. The negative ascertainments referring to the healthcare systems effectiveness, and also a few other reasons, led into an extended crisis, whose main characteristics are:

  a) The continually increasing costs, that in a period of an economic crisis would have put the countries' social and economic development in a risk.

  b) The system's inability to improve the mortality and morbidity rate indexes.

  c) The inability to intercept the continually widening inequities of health care delivery.

  d) The evolution to a hospital-orientated, expensive and impersonal medical system.

e) The evolution of the doctors, into a powerful and uncontrolled professional group, with negative consequences on their working status and on their relationship with patients.

All these weaknesses undermined the health system's reliability provoking mistrust and disputation **(Theodorou, 2001)**.

More specifically in Europe, the health policy has confronted some common problems during the last twenty years, which are mainly referring to **(Rice and Smith, 2000)**:

a) Restraining the health services expenses to a low level.
b) Assuring some kind of equality and universality in accessing the health services.
c) Providing high quality health services.

Most European countries have taken a variety of actions in order to cope with these problems.

The organizational interventions, that had initially been applied in order to improve the equality, the access and in fact the citizen's health condition, have considerably been restricted because of the worry for inevitable restraining of the expenses. In Western Europe, in the beginning of the 80's the successful control of the expenses in a macroeconomic level was replaced in the 90's by an effort to restrain the increasing expenses in the microeconomic level of the health services providers. **(European Observatory on Health Care Systems, 2002)**

Nowadays, many western European countries continue reforming their health care system, searching for alternative strategies to finance and provide more effective and equally distributed health services. In some countries (such as Germany and United Kingdom) overall reform programs are applied. In other countries, more limited reform strategies are introduced in order to overcome certain problems of the health system **(WHO 1996)**.

Yet, there are few empirical outcomes reports about the effectiveness of such policies, not only in countries that eventually adopt them, but also in the counties that produce those policies.

Thus, the majority of measures and policies from the 80's and the attempted health system reforms in the 90's in most European countries, have not yet led in the desirable results. The health system suddenly became and continues to be in the centre of interest and research, so a new strategy can be engraved.

3. The Greek Health System – Features and Evaluation

In Greece, although the repeated interventions since the early 50's, the establishment of a National Health System (ESY) was not achieved till 1983. However, the ESY never had the features of an integrated system, due to the number of the public insurance organizations and their variety characteristics. As a result, the inequalities and the differences concerning the costs and the quality of the services delivered to the population continue existing.

The Greek basic characteristics of social protection (social insurance fragmentation, protection inequality, debt management often on a client basis) have been for a long period in accordance with the general structure of the Greek society.

The main issues that the Greek healthcare system policy planners face are the distorted financial motives, the lack of coordinating the financial resources and the inability (or in many cases unwillingness) of opposing the established entitlements of organized groups. The recent reforms are rather impossible to transform this situation radically.

The foundation law of ESY described the l principals of universal cover, the access independently from the people's ability to pay and the effective use of the resources. However, after a careful system analysis, it is demonstrated that these principles had never fully implemented:

- The population groups receive different cover and access levels by the health care providers
- The patients either pay out of their pocket a significant portion of the health care services cost or have to buy private insurance plans.

After a careful study of the available data about the health care financing, it is clear that the ESY seems to be much more conservative now comparing to its initial targets in the '80s, with the financial burden of the health services being unequally distributed among the population social groups. The extremely high proportion of private health expenses, the extended informal payments and the structure of the taxation system, affect progressively vice versa the system's equal division.

According to recently published data, **(OECD, 2002)** in Greece the total health expenses, as a GNP percentage, is higher than the E.U. average,

higher than in other southern European countries, but also with the higher proportion (highest within E.U.) of private expenses.

The economic pressure to reduce the public debt during the 80's and the foreign pressure to reduce the state expenses during the 90's, so that Greece fulfills the EMU admission criterions, can partly explain this trend.

By examining the access to the healthcare system, it can be assumed that there is no discrimination on accessing primary healthcare services. However, people with higher income, use more specialized primary healthcare services, but it is not quite clear whether access in hospital services is higher for poor people or if that kind of access impress greater need. Up to a great extend this "equal" access is achieved with an important cost for the lower-income groups of society. **(WHO, 1996)**

In the area of health services planning and decentralization, the results were not the expected ones. Traditionally the resources have been concentrated in Athens and Thessalonica. Furthermore, the activity of the private sector has also been centralized in these areas where the demand for that kind of services is higher or there is a hidden state underinvestment. Moreover, the policy planning, the funding and the inspection of the medical staff have been all concentrated in the center, even though regional health systems (DYPE) have been established, with doubtful efficiency. **(Tountas et al. 2002)**

The structure of the system has been greatly improved. But, the imports within the healthcare system appear to be expensive, with an exaggeration on the high-technology medical equipment, especially in the private sector, which still remains uncontrolled. There is also an excessive use of hospital care and a lack of alternative solutions with minimum or none at home care delivery and long-term care.

In terms of using the services, evaluating the outcome and feedback the system, the results are negative. In view of the technical efficiency, a system is usually evaluated whether it is capable not to consume many resources while delivering its services, or not to pay high fees to the owners of the resources, or not to provide excessive profits. Unfortunately, none of the above cases are presented in Greece. This can be easily shown by the high margins of profit of pharmaceutical companies, and in addition from the over-prescription and medicine consumption (especially of the expensive third generation antibiotics). Also the use of unnecessary

expensive diagnostic examinations reveals aspects of the same problem. Furthermore, many specialized ESY hospital doctors, mostly surgeons, gain high incomes, due to the extra and informal fees they demand.

In fact does not exist evaluation mechanisms of the necessity of healthcare services and consequently their economic efficiency. Finally, there are no Hospital Information Systems, fully integrated and interconnected.

To sum up, although there has always been an everlasting demand for a high quality ESY for all citizens without discriminations, no government reform managed so far to efficiently balance the multiple irregularities and its injustices. As it is unfortunately noticed, there seems to be a political consentient, which favors all kinds of excursive approach, that nobody really desires, but no political majority favors the imperative (and usually unpleasant under the political criteria) fundamental reform. The established entitlements, the lack of political willingness, the inability and the fragmentized management, restrict the available reforms (**Mossialos and Davaki, 2002**).

4. Primary Healthcare in Greece–Health services demand and Health Insurance

Primary Healthcare is a wide concept, which refers to a continual health services delivery process that is also delivered to healthy people. On the contrary Primary Medical Care is a narrower concept, which refers to individuals that have been ill and have shown subjectively or objectively the illness symptoms (**WHO, 1978**).

Primary healthcare concerns a strategy, which emphasizes on the non-hospital health system sector, where the patient has its first contact with the official health authorities.

Primary healthcare in Greece, as a subsystem, has also the characteristics, previously described.

The primary healthcare services are delivered in Greece by:

1. The state, through the health centers and the regional small clinics (for the counties) and out-patient hospital departments (for the urban areas).
2. The insurance organizations, through their healthcare units and multi-clinics (mainly Social Insurance Institute–IKA), also through contracted private doctors and labs for other funds.

3. The local authorities, which deliver limited healthcare services, through a small number of municipal practices.

4. The private sector, which is an important part of the whole health system.

Many insurance funds are operating in Greece (more than 30), based on different financial resources, most of them having a very small number of insured people and deliver different ways of accessing the services. Thus, the insured people in IKA (around 50% of the country's population) are exclusively served by it's own doctors and equipment (also in some cases by contracted doctors and labs), the insured in OGA and OPAD are served in the health centers, the out-patient hospital departments and some contracted doctors and labs, while the other insurance funds insured members are served only in contracted doctors and labs.

The primary healthcare demand, as it has not been yet applied the procedure through the general practitioner, is directed toward to specialized doctors. These are usually the patient's first contact with the system and there is the ability of directly forwarding to the secondary healthcare.

The long waiting lists for the out-patient departments and laboratory exams, force the insured people to find a way out, either through an emergency incidence, or through using the private sector services (**Jofre-Bonnet, 2000 and Besley et al, 1996**). Thus, due to fact that most of these incidents do not have the characteristics of emergency, expensive resources are spent to come up with insignificant health problems or just annoyances, leading to great deviation the technical efficiency of the system. Moreover, the lack of a general practitioner, who will work as a "gatekeeper" against the huge demand for primary healthcare, but also as a more efficient way to forward patients in the health system, has as a result a continuous gap in the medical information, between the primary and secondary healthcare.

The lack of information about the patient's condition and the absence of medical records in a primary healthcare level, usually lead to unnecessary visits, repeated examinations and over-prescription. This is inefficient, but also medically inappropriate and unacceptable and it may harm the patient.

The problem is intensified, as a large number of the diagnostic and laboratory examinations are done by the private sector and many doctors are influenced by different sources to direct the patients there. Relevant and a huge burden to

the economics of the health sector, but also a disadvantage to the patient's health, appears to be the over-prescription and directed prescription, through provocative now means by the pharmaceutical companies to the medical world for affecting the drug selection **(Mossialos and Davaki, 2002)**.

Another important factor that affects the primary healthcare demand is the geographical distribution of the health centers, as the distance and the access ability have affected the access to them. This is of a great importance mainly for the elderly population, who constitute a large percentage (especially in the countryside) and who is not capable of accessing services equally than those in urban areas.

Published evaluation research about the primary healthcare in Greece is rare. A relevant with IKA research **(Zavras et al, 2002)**, used data from 133 IKA health units, referring to the year 2000. The findings showed that the health units with the technological structure to carry out laboratory and X-ray examinations had higher efficiency indexes.

In another research, **(Sissouras et al, 2000)** there were studied the efficiency of 24 health units in counties and suburban areas referring to the year 1996.

To sum up the main primary health care issues, from what has so far been mentioned **(Theodorou, 2001)**:

1. Great provider fragmentation in different shapes, great inequalities in the contribution and services procedures, overlap and unconnected forms.
2. Considerable lack of technological structures, especially in the urban areas.
3. Considerable lack of general practitioners and nursing workforce.
4. Low income for the doctors and lack of incentives for a higher productivity.
5. Absence of family doctors, and of a system managing the patient's route within the health system.
6. Restricted system's availability in the evening and late hours, the weekend and holidays.
7. Reduced reliability of the public health system.
8. Absence of controlling and evaluating mechanisms.

The findings marked out the inefficiency of the health centers with the lowest cost-benefit prices appearing to the units based near to hospitals.

5. Demand Management and Integrated Delivery Systems

5.1. The Demand for Primary Healthcare Services

The most important factors that affect the primary health care demand in the ESY, which are usually parts of the demand equation are:

1. The number of the doctor visits in the out-patient hospital departments.
2. The complementary and competitive products and service prices.
3. The insurance organization.
4. The existence of a complementary insurance coverage.
5. The required time accessing the out-patient hospital department and the waiting time to receive the treatment.
6. The income.
7. The insured's health index.
8. The insured's sex.
9. The insured's place of residence.
10. The insured's age.
11. The educational level
12. Other socioeconomic factors.

The primary healthcare demand estimation is a difficult task to be precisely calculated. Except of this difficulty, the demand is also affected by other external factors (Ifantopoulos, 2003), such as:

- The population health condition.
- The general epidemiological profile (and more particularly the chronic diseases).
- The population demographical ageing.
- The economic growth and structure.
- The social understanding about the diseases and the use of health services.
- The cultural values.
- The system organization and funds.
- The technological structure, mainly those of medical equipment.

5.2. The primary health care services demand management

Primary health care services demand management is defined as the process of recognizing:

- How,
- Why and
- By whom,

The primary health care services demand is created, so that later the development of a more efficient and equal health care system will be possible. In fact, it depends on the behavior understanding of those that affect the demand, which means the patients and the doctors. It is about having a more efficient use of the health care services (not necessary through seeking reduced or cheaper services). In particularly, the primary health care services "demand management", is the supporting of people (patients and medical staff), so that they can take reasonable decisions, after taking into consideration the health condition and the medical science and practices, based on a cost-benefit estimation **(Pencheon D., 1998)**.

At this point it should be expressed that the features of the primary **health care services demand management** system are:

1. The primary health care services demand management, has as a starting point the increasing demand for health services, so that the individuals and population health care needs are served better with the available resources.

2. The primary health care services demand management does not necessary mean demand decrease. Wherever there is economic efficient health care that is under-utilized, the demand could and should be encouraged.

3. There is the ability for a development of a more gradual access in the health care system.

4. An important way to manage the health care demand is to provide and make accessible to the public simple advices and directions, relatively with the delivery of health care.

5. It is possible to satisfy the health care demand with many different ways.

6. Opportunities and incentives are welcomed to the people engaged, as complementary measures of typical health care.

According to the measures mentioned above, the health service demand management targets are in fact useful for the maximization of the whole satisfaction of needs for the majority of insured people, under the resources available. The efforts to adjust the health services can be targeted to three different groups:

1. To the patients
2. To the health services providers, or
3. To the health system in general.

In a point of view, the management of health care demand, in the primary health care, is nothing else but the management of the health system demand in all the movement of the patient within the health system (Gillam, 1998). The diagram 1 bellow shows some of the strategies that can be applied more systematically in a primary health care level:

Figure 1: *Primary Health Care Demand Management Strategies.*
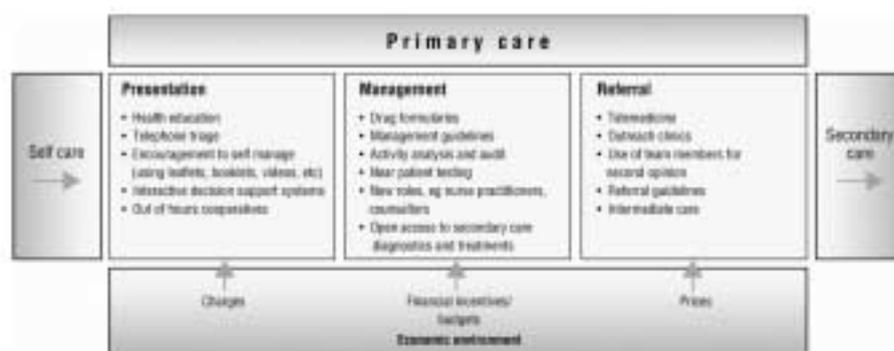
5.3. The management of primary health care services demand in the European and other countries

The primary health care services demand management policies was considered of great importance, especially in countries where the attention in the past was focused on levels of secondary health care and particularly in those that the family doctor or at least a system's "gatekeeper" did not exist.

It is characteristic that in European countries where the family doctor exist as the system's "gatekeeper" (Ireland, Italy, Netherlands, Norway, Portugal, Spain and United Kingdom), the per capita expense for health, appears to be significant lower than in the other countries, but also lower per capita expenses as a GDP percentage. The same countries appear to have high productivity rates and low prescription numbers, while (as it was expected) they also have a high number of references to specialized doctors or to secondary health care (**Jepson, 2001**).

On the other hand, in the United States the primary social health care is applied only through the Medicare System, (for everyone older than 65 and the people with permanent disabilities). The participation in Medicare is optional and covers part of the expenses. There is also the Medicaid System (for the people with an extremely low income, the unemployed, the individuals with long-term health problems etc), which covers almost the whole spectrum of health services. The US health system has the features of a private model and function under the free market laws and with the minimum possible state intervention. As a result, the US health system is nowadays the most expensive health system of the world, having in the same time the lowest state health expenses percentage participation and the uninsured people exceeding 35 million citizens (**OECD, 2004**). Thus the primary health care is almost exclusively delivered by the private sector, either through the insurance companies, or through "Managed care" system (**Pollalis and Heckman, 1997**).

The "Managed care" systems were initially founded as health delivery service systems, in an estimated and prepaid basis, involving prevention and illness management services. But the insurance companies used their basic features and their structure as a way to contain the dramatically increasing health services costs. In fact, the Managed Care systems set limits in health services usage by determining which and how many services are covered and which providers will be contracted to provide them. The "Managed care" systems are in force under many forms and new structures are still developing, making their generalization a tough task. Usually these systems have these common features (**Edmunds & Frank, 1997**):

1. They contract with selected health providers, in order to deliver a wide health services spectrum for their insured people

2. They use clear criteria and standards in the selection of the health services providers

3. They apply standardized programs that secure the health services quality and control of their usage

4. They offer incentives to their insured people to use their providers and their programs

Since the mid 80's the Managed Care systems developed (at least in the USA) after passing through three stages (**Vozikis, 2004**):

1. In the first stage they focused their attention on managing the access on the health services, mainly by using controls of the service's use and management obstacles such as the pre-required permission to enter a hospital.

2. In the second stage, they focused their attention on managing the treatment, using selective contract signing and treatment planning.

3. In the third stage, the attention is paid on managing the incident. And with a turn, from the control report for the use of a treatment, into the active management while the treatment takes place. It also becomes important factor the inspection of the necessity and the appropriation of the given treatment to the insured patient.

In the next stage, which is still under formation, the emphasis will be given to the treatment outcome and the development of an integrated secure health support system (**Hord, 2000**).

Nowadays, the most famous Managed Care forms, as they are appeared in some countries, consist of the H.M.O. (Health Maintenance Organizations), P.P.O. (Preferred Provider Organization) and P.O.S. (Point of Services) (**Pollalis and Heckmann, 1997**).

In chart one there are described the major features of each form (**Glied, 1999**), after taking into account that each form can be found in many variations:

Table 1: *Managed Care Forms.*

Forms	Characteristics
Health Maintenance Organization (H.M.O.)	A prepaid, organised delivery system where the organisation assumes financial risk for the care provided to its enrolled members. Financial risk may be transferred to clinicians through capitation and other financial incentives.
Preferred Provider Organization (P.P.O.)	Networks of hospitals, physicians, and other health care professionals that provide medical care to individuals for a negotiated fee. They do not assume financial risk for arranging for health care benefits. Risk is assumed by the sponsoring organization (e.g., insurance company, self-insured employer, etc.)
Point-of-Service (P.O.S.)	a network of healthcare providers that forms for the purpose of contracting with purchasers and government entities to assume risk of providing medical care

6. Effective Health Services Demand Management – Content, Implementation and Evaluation

After many years of primary health services costs and use ratio spiraling, the insurance organizations where forced to seek strategies in their effort:

1. To restrain the rapid increasing costs of primary healthcare and in the same time,
2. To preserve or even improve the quality of the services to the insure people.

In this chapter we examine the presence of the modern social health insurance in a modern environment, and more particularly whether and how the Insurance organizations have reform their strategies in the primary level of health care demand management, in order to control their

increasing costs. The understanding of these strategies and means would help, at this stage, to evaluate their efficiency, to find out and mark the malfunction, and in a second stage to make recommendations in order to deal with these problems.

For that research four public insurance organizations (IKA, OGA, OPAD and OAEE) were chosen by the criterion of the number of their insured people, they cover for primary health care services. Also the geographical coverage of their operations, the various kinds of services they deliver and of course their willingness to provide all the information for our research. These organizations were considered absolutely sufficient, as the total number of the insured that are covered for primary healthcare services, exceeds 95% of the total insured people with that kind of insurance.

Many important issues raised by this research, about their strategies in managing the primary health care services demand:

1. In terms of planning, applying, and financing the primary health care programs, it is noticed that:
   - There is a tendency to deliver health services through integrated programs.
   - There is a focus on the quality of the health services delivered.
   - There is a tendency to increase the insured cost participation
   - There is an increased adaptability on the free market terms.

2. Mighty insurance organizations either use their own resources to provide primary healthcare services or they contract with state providers. They also contract with private health service carriers, using their market size and brand so that they can succeed in gaining terms.

3. The structure that manages the primary health care delivery issues is stiff and instead of combining the selection of the right timing and having the opportunity to adopt radical and rapid reforms, they choose gradual and time wasting reforms.

4. All the insurance organizations recognize that primary health care services are of low level quality.

5. The insurance organizations focus on the strategies about demand managing issues of primary health care services through different means, that can be grouped in three groups:

- Developing criteria of evaluating the primary health care programs
- Methods of directing the insured's behavior and affecting the individuals in the selection of certain services
- Allocation of the healthcare workforce

6. All the insurance organizations recognized the absence of organizational structure and the means for a rational estimation of delivered services cost, although they consider it as very important.

7. All the insurance organizations are convinced that the insured's participation is of great importance in the effort to contain and reduce the cost.

8. All the insurance organizations are in the stage of developing the managing systems for primary health care services. These include many features of the "Managed Care" systems, although most of the organizations believe they do not have the ability of an immediate appliance of these strategic programs, due to either their public character, or due to other organizational weaknesses to support these forms.

9. Only IKA has designed and developed an information system, in order to manage the primary health care demand services, which is capable of providing an integrate service for the actions and procedures that are scheduled according to the institution's modernization program.

10. Finally, all the insurance organizations recognized that in many levels there is a lack of information about the primary health care demand. This has resulted possible to false planning, inadequate evaluation and a lacking strategy in this important sector.

As a result, it is clear that in Greece, there aren't any strategic decisions toward the adoption of "Managed Care" systems by the insurance companies, in order to evolve like the example of other countries.

From the insurance organizations mentioned above, only IKA has an actual strategy in their effort to manage the primary health care services demand.

The rest have not applied modern techniques of managing the primary health care services demand. Thus, their actions have been limited on traditional procedures, aiming to the reducing of primary health care demand only. Also the restraining of the cost for services delivered through

the insured's participation, but without be willing to be engaged in demand, the management of quality control process, the quantity and the necessity of the services delivered, through developing the suitable procedures and mechanisms **(Pollalis, Yannis A., 2003)** .

Indicative of the inefficiency of these outmoded policies, is the recent publication by Ministry of Economic and Finance with data relevant to the cost of several insurance organizations for the insured's health expenses. Indicatively it is reported that the per capita expenses for public employees' health care are 50% higher than the corresponding expenses of the IKA insured, while audits for examinations and the prescriptions are totally problematic or even absent.

Furthermore, while the per capita insured expenses in the insurance funds, comes up to 310 euros for medicine, examinations, and prescription giving, in the state insurance organization exceeds the 450 euros. However, the most important is that the differences are indicated mainly in the primary health and medical care.

7. Conclusions–Proposals

Concluding, it is clear that in Greece the insurance organizations, with few exceptions, face absence of information, limited intervention in fact and even less control in the primary health care services, not having the ability:

a) To manage the insured's primary health care services demand

b) To determine the health services cost basis, and as a result to quantify them under scientific criteria

c) To intervene in the process of primary healthcare cost creation, which is mainly affected by the volume and the unit price of the services used

d) To have control in the necessity and the quality of the services delivered

e) To engrave a strategy in the area of primary health care

f) To engrave a strategy in the area of ICT, aligned with the integrated organization strategy

These inabilities are mainly due to lack of systematically update and managing the healthcare services demand, especially in a primary level.

In the same time, the insurance organizations have not developed modern health plans, to deliver through their insurance programs. Those plans supported also by integrated information systems, would have the ability to collect, record and analyze the data of the insured's primary health care demand and consumption. These data would give the opportunity to be statistically analyzed and compared with other data of the insured or other population groups **(Vozikis, 2004)**.

The fundamental condition to create such systems is the adaptation of internal and external procedures, so that a modern primary health care management to be applied and delivered through health services from the organization itself or with the collaboration with other public or private providers **(Ziegler, 1998)**.

The ideal access system in the health care, structured on the philosophy and the features of the Greek health system, should have the form below:

Diagram 2: *Health Services Demand Management Process.*
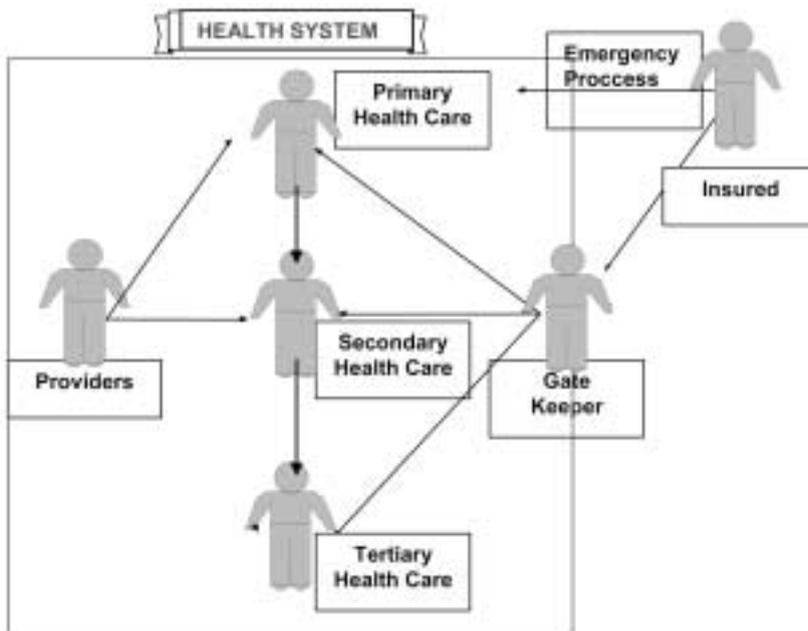
A related and overlapping trend is the development of vertically integrated delivery systems that combine physicians and other health professionals, hospitals, rehabilitation units, social services, chronic care capabilities, mental health and substance abuse programs, and health promotion and disease prevention programs into an organized whole that can provide and coordinate a comprehensive array of services (IDS-Integrated Delivery Systems). **(Institute of Medicine, 1996)**.

These systems are not a new phenomenon; some of the older staff and group model HMOs have had many of these characteristics for some time. What may be new is an environment that encourages change rather than one that regards innovations as a questionable deviation from the norm. The pressure for continuing improvement in the cost-effective provision of services is present in older.

These systems should embody features present in the Greek reality, both to the insurance market and the health services market. There should be taken into account the distinctiveness of the health social insurance, in particular, as well as the oligopolistic environment in which the private health industry operates. The systems should be based on procedures of integrated health care systems of third level, at least during the beginning year, with an upgrade prospect in the next level, during its mature period **(Pollalis, Yannis A. and Grant, John H., 1994) (Pollalis, Yannis A. and Heckman, Robert 1997)**.

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1680–1747 OTTOMAN BUDGETS AND DEFICITS SUSTAINABILITY IN A PERIOD OF FISCAL TRANSITION: WARS AND ADMINISTRATIVE CHANGES

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Abstract

This paper studies the sustainability of the Ottoman budget for the period from 1680 to 1747, during different sultanates and war eras. Moreover, we investigate whether the relationship between government revenues and expenditures changes in the period of *julus*. The empirical evidence gathered in this paper suggests that during the sample period, except for the sultanate era of Mahmut I, the Ottoman budget was not sustainable. The other interesting result of the study is that *julus* payments had a significant tax increasing effect. Moreover, the distribution of *julus* deteriorated the sustainability of budget.

JEL classification: N43, N45 and E62.
Keywords: Budget sustainability, Structural factors, Ottoman Empire.

1. Introduction

1680–1750 period was a transition period in Ottoman history. In the period of the Koprulus' grant vizierates, there were attempts to reinstate the system of traditional autocracy. However, these efforts were total failures in the war period of 1683–1699. In the 18th century, local powers and provincial families increased, so the 18th century was a decentralisation interval for the Empire. After the siege of Vienna (1683), the period of *stagnation* closed and a period of *decline* started. The chief problems of the period were the budget deficit and its sustainability.

This paper examines the Empire's central budget deficit sustainability in

the period from 1680 to 1747. The data set obtained from Tabakoglu (1985)[1] contains cash revenues and cash expenditures. The sources translated from Ottoman language were Ottoman budget documents *ruznamche*[2] and budget yearbooks. According to the *ruznamches*, income and expenditure accounts were expressed in local currency, the *Akche*. The aim of this study is to determine the deficit sustainability of the sultanate intervals and the continuous war periods during this transition era. Our estimates suggest that the budget deficit was not sustainable in either the sultanate eras of the sultans or the war eras. The only exception is seen in the reign of Mahmut I, when the deficit was sustainable. When we sought the reasons for these estimation results, we found that there is a correlation between deficit sustainability and each of the following conditions: increased expenditures in war periods, payments made to *Janissaries* and policies applied by the sultans reigning during that period. This paper aims to enrich the academic literature on the Ottoman economy with the findings about budget sustainability for the 1680–1747 period as well as for various sub–periods. The next section elaborates on government expenditures and revenue figures in the light of historical developments. Section 3 explains the econometric method used in this paper. The empirical evidence is presented in section 4 and section 5 concludes the study.

2. War Period and Financial Problems

   After the siege of Vienna in 1683, bureaucratic and military expenditures, in particular, increased. Following the defeat in Vienna, the war continued between Austria and the Ottomans. While the Ottoman army was retreating towards Edirne, permanent and temporary land losses occurred in the Balkan region as a result of the battles. In addition, after the 16th Century, the share of central revenues in total revenues began to decrease. One of the main reasons for this was an increase in the defence expenditures of the state because castles on the borders required expenditures to fulfil their functions. In the mid–16th Century, the central government had been able to control 58% of total revenues but in the 17th century, this amount retrogressed to 25%. As a result of these developments, approximately all of the revenues belonged to the sultan and

in war times, a large share of the sultans' revenues from Musul, Diyarbakir, Baghdad and Crete were spent in these provinces. Thus, the revenues of provinces not in the *timar* and *waqf* systems started to be discluded from the central budget accounts. The spending of revenues locally, the transfer of Egypt's waybill into the internal treasury and the assignment of some revenues to the personal treasury of the wives of sultans limited the financial area controlled by the budget of the central government. It can be seen that the Ottoman financial and budgetary system in the period between 1680 and 1747 exhibited a limited central and extended local characteristic as a result of the reasons given above.

Especially as a result of late *mevacip* and *julus* payments to the *Janissaries* and the discontent due to defeats, there were a threat of a military revolt in the capital, Istanbul. The uneasiness caused by army based financial problems came to light with breaking out of three military revolts during the period from 1680 to 1747. These events shook the roots of the Empire and resulted in the dethroning of Mehmet IV in 1687, Mustafa II in 1703, and Ahmet III in 1730[3]. The jumps in expenditures for these dates and the deterioration of the central budget can be seen in Figure 1. In the 17th century, the *Jelali* revolts and wars with Iran led to a reduction in the population of Anatolia and accelerated migration to the cities. Parallel to these developments, agricultural production decreased and local governors, *Ayans*, gained power against the central government[4,5].

3. Econometric Method

In order to assess the sustainability of the Ottoman budget, we estimate the following equations.

$$\text{Revenue}_t = \alpha_0 + \alpha_1 \text{ Expenditures}_t + e_t \qquad (1)$$

where *Revenue*$_t$ is the logarithm of government tax revenues, *Expenditures*$_t$ is the logarithm of government expenditures and e$_t$ is the residual term at time t. α_0 and α_1 are the parameters of interest. In this paper, we also examined how the relationship between *Revenue*$_t$ and *Expenditures*$_t$ is affected by various factors such as different sultanates, different war periods and *julus* payment periods. In order to account for

these factors, we also included dummy variables (D_t) into the analysis specified in Equation 2.

$$Revenue_t = \beta_0 + \beta_1 D_t + \beta_2 \, Expenditures_t + \beta_3 \, Expenditures_t \,^* D_t + e_t \qquad (2)$$

The dummy variables used in this study are for each sultanate, *war* and *julus* period. When the particular condition is present, the dummy variable (D_t) takes the value of 1 and zero otherwise. When the parameters of estimates are interpreted, the autonomous revenue will be $\beta_0 + \beta_1$ if the condition is met ($D_t = 1$) and β_0 if the condition is not met ($D_t = 0$). Similarly, the induced revenue will be $\beta_2 + \beta_3$, if the condition is met and β_2 if the condition is not met[6]. It is also important to note that government expenditures is not an exogenous variable but is affected by various factors, including government's revenues. Hence, performing least squares estimation will give us biased estimates. In this paper, the Two Stage Leased Squares (2SLS) Method is used to address this problem. When the 2SLS estimates are gathered, we used two–lag values of *Expenditures*$_t$, *Revenue*$_t$, D_t, *Expenditures*$_t \,^* D_t$ sets as instruments.

4. Empirical Evidence

In order to analyse the budget sustainability, we used monthly data from 1090 to 1159 in the Hicri calender, which is a calender based on the moon and a year lasts 354 days. The data, including cash revenue and expenditures of the Ottoman central budget, is gathered from Tabakoglu (1985). The sources are translated from the Ottoman language. The basic sources of the data were Ottoman budget documents, *ruznamche*, and various budget yearbooks recorded in the local currency, the *Akche*.

When we examine the sustainability of the budget deficit for the sample period, we need to consider three different factors as sources of possible changes in the deterioration of budget sustainability. These are differences in sultans, war periods, and *julus* payments. Regression results examining these factors are summarised in Tables 1 to 6. Table 1 reports the deficit sustainability analysis for the full sample as well as for the reign of each sultan. Tables 2 and 3 represent the results of the analysis in the specific historical eras of this period and Table 4 reports the estimates for the Iranian

war era but it also considers Mahmut I's sultanate during this war era. Table 5 gives the estimate of the testable model for the times of *julus* payments. The last table, Table 6, reports all these estimates with a Revenue–Expenditures ratio rather than with a *Expenditures*$_t$ and *Revenue*$_t$ used in Tables 1–5. In these Tables, parameter estimates are reported in the first row and *t–values* are written in parentheses.

Table 1: *Revenues–Expeditures Relationship for Each Sultan.*

Sultanate	Constant	Expenditures	SSR
Full Sample (1680–1747)	1.712[*]	0.921	1203.5
	(0.773)	(7.182)	
Mehmet IV (1648–1687)	18.653[**]	−0.093	89.417
	(2.12)	(−0.179)	
Suleyman II (1687–1691)	8.988[**]	0.479	50.383
	(1.814)	(1.656)	
Ahmet II (1691–1695)	9.63[**]	0.433	51.533
	(1.658)	(1.262)	
Mustafa II (1695–1703)	8.57[**]	0.521	77.804
	(1.675)	(1.739)	
Ahmet III (1703–1730)	7.475[**]	0.594	344.503
	(2.194)	(2.984)	
Mahmut I (1730–1754)	−10.887[**]	1.628*	693.057
	(−0.643)	(1.717)	

Note: [*]   *Indicates a significance level of 10%.*
[**] *Indicates a significance level of 5%.*
    t–statistics are reported in parentheses under the corresponding estimated coefficients.

If the estimated coefficient of *Expenditures*$_t$ is less than 1, this suggests that a government continues to spend more than it collects, we took this indication as a risk of default in the long run. For this reason, the interest rate that the government has to offer to service its debt would be higher. Hakkio and Rush (1991) note the necessity that the coefficient of expenditures be equal to one for the sovereignty of the debt, which also implies a balanced budget. While evaluating results of the analysis, our criterion is that if the coefficient is less than one, then the deficit is unsustainable; if it is greater than or equal to one, then the deficit is

sustainable. In economic literature, it is prescribed that when the growth rate of a budget deficit is less than or equal to the growth rate of the economy, then the deficit is sustainable. However, we cannot consider the criterion in this study because we lack growth rate data for this period of the Ottoman economy. For this reason, the criterion mentioned above is used in the study as the indicator of deficit sustainability. One may also argue that observing just the slope coefficient while ignoring the constant term may not show the sustainability of the deficit properly. Autonomous revenue (which is captured by a constant term) shows the revenue not depending on expenditures. If the Keynesian theory is right, then expenditures stimulates the output, so the tax revenues will increase under a flat or progressive tax system. Thus, autonomous taxation depends on various factors, such as per head taxation, but it does not depend on economic performance. In the long run, the role of autonomous taxation will decrease and the budget will not be sustainable if the slope coefficient is less than one.

The results of the analysis are summarised in Tables 1–5. In Table 1, the deficit sustainability conditions in 1680–1747 period of the full sample and each sultan are reported. In the sample period, there were six reigning sultans in the Empire: Mehmet IV (1648–1687), Suleyman II (1687–1691), Ahmet II.(1691–1695), Mustafa II (1695–1703), Ahmet III (1703–1730), Mahmut I (1730–1754). For the full sample, the coefficient of expenditures is less than 1 (0.921), which means that the budget deficit was unsustainable. *Constant* term accounts are taken for autonomous taxation, which usually accounts not for efficient allocation but for fixed and per head taxes. In Table 1, *constant* represents the autonomous taxation and this coefficient is 1.712 for the full sample, which is a small coefficient compared to the sub–sample periods. To understand the use of taxes to finance the accelerated expenditures, the information below will be helpful.

When the full sample is considered, the considerable changes and administrative difficulties either in the provinces or in the central government are seen. The expenditures of local revenues locally significantly limited the financial sources of the central budget, and sultans' moving to Edirne because of the fear of revolt created an administrative dominance struggle in the capital. Sharply increased expenditures led governors to find new sources of finance. In different periods of the sample, new taxes were levied. However, finding new sources was not enough to

cover the speed of the increase in expenditures (see Figure 1). The increasing cash need led the central government in the time of Mehmet IV to levy a new tax named *"imdadiyye"*. Initially, this tax was collected to finance military expenditures in urgent times and in long lasting war periods, but within a few decades it had become a regular tax collected in different amounts in either war or peace time. The grand vizier of Suleyman II, Kopruluzade Fazil Mustafa Pasha (1689), tried to reform the tax system during his short administration. The other type of taxes levied in extraordinary cases was *"avariz akcesi"*. After 1683, these taxes became regular items in the central budget as well. Thus, it can be seen that sultans had a strong tendency to increase autonomous taxes to finance the increasing cash needs, but from time–to–time some governors tried reforms to decrease the tax burden on taxpayers. For instance, in 1689–1691, Koprulu Fazil Ahmet Pasha's period, the revenues exceeded expenditures (see Figure I). In the sultanate of Ahmet III, especially the Tulip Period of 1706–1729, sometimes there were excess revenues because of the peace policies and different applications of the sultan.

We elaborated on the idea that budget sustainability could be different for each sultan and each war era. The deficit sustainability indicator of the equation, the coefficient of *Expenditures*$_t$, is less than 1 for all of the six sultans in Table 1, except Mahmut I (1730–1754) and for all of the three intervals in Table 2 except the Ottoman–Iran War (1723–1746). Hence, we perform the regression analysis for each sultan and each war era. The results reported in Table 1 indicate that in the sultanates of five sultans, the budget deficit was unsustainable. The lowest coefficient is -0.093 for the time of Mehmet IV. His reign was the beginning at the big land losses after the defeat of Vienna. There was also administrative uncertainty during this interval. He was six years old when he became the sultan. His reign was full of political and military problems. For instance, the first years of the Sultan passed under the strong domination of his mother Kosem Sultan. The power of the central government both in the capital and in the provinces weakened. The *Janissaries'* were in control in Istanbul and Jelali pashas' control led the provinces. The other times when the coefficients of *Expenditures*$_t$ were less than 1 are: Suleyman II, 0.479; Ahmet II, 0.433; Mustafa II, 0.521; and Ahmet III, 0.594. During these periods, war expenditures were a big item in the central budget. During these reigns of

five sultans of the sample period, these costly wars continued. In the sultanate of Suleyman II, the fight against Austrians continued in the Balkan region and the Russia attacked to the Crimea. In the time of Mustafa II, there was a big defeat in Zenta. In the time of Ahmet III, wars with Austria on land and with Venice at sea continued, and there were also occupations of Iran in Azerbaijan and Hemedan. Besides the great financial burdens of the wars, there were *Janissary* revolts either in the capital or in Rumelia for *julus* and other payments. As seen in Table 1, the highest coefficient among the coefficients of expenditures less than one, 0.594, is in the sultanate of Ahmet III. The peace policy of Ahmet III in his relations with the other states can be mentioned as an important reason for the higher coefficient. The only coefficient of expenditures greater than 1 is the coefficient of Mahmut I's reign. In his time, wars with Iran in the east, with Austria in the west, and with Russia in the north were generally successful: the Belgrade Treaty with Russia and Austria (1739), the Hemedan Treaty and treaty after the Musul War (1746) with Iran. All of these treaties seemed advantageous for Ottomans. There was no military revolt in his sultanate. The *Constant* in Table 1 represents the autonomous taxes. For the full sample autonomous taxation has a positive coefficient. The 1680–1747 sample was a continuous war period and to finance these wars, the central administration levied extraordinary taxes (*Avariz*, *Nuzul* and *Sursat*), which became regular in a short time. Three important sources of revenue were *mukataa*, *jizya* and *avariz*. The highest revenues collected from *mukataa* were at the beginning and end of the period because in between war periods led to decreased *mukataa* revenues. *Jizya* revenues were increased in the time of the tax reforms of Kopruluzade Fazil Mustafa Pasha in the 1690s. In the 1683–1700 interval, *jizya* was collected in advance (generally one year). In the last years of the sample period, *jizya* revenue retrogressed. The extraordinary tax *Avariz* was increased in war times and decreased in peace times. These movements in taxes can be followed in Figure 1. When we consider all the sultans, the highest autonomous tax was in the sultanate of Mehmet IV, 18.653. After the Vienna siege, temporary or permanent loss of land led to a decrease in *mukataa* revenues. In the time of Suleymen II, copper coin usage changed the exchange rate of foreign currencies. Then, expectations of instability in the market, *Hasses* of the Sultan and *mukataas* were removed from the

iltizam system but in this period the tendency for autonomous taxation was not as high as for Mehmet IV, only 8.988. In the sultanate of Ahmet II, we saw the tax reform of the Kopruluzade Fazil Ahmet Pasha. To be able to increase tax revenues, *jizya* (collected from each household) started to be collected per head, as in the past. In this new system, the criterion was the ability to pay[7]. After these sultanates, autonomous taxation started to decrease (Table 1) because from time to time treaties like the Karlowitz Treaty (1699) and the treaty with Russia (1700) were made. In the peace periods, disorders in the *mukataa* system were dealt with and revenues from *mukataas* increased, which meant a decrease in the amount of extraordinary taxes. The people living in Tamishvar, Belgrad, and Bosnia were exempted from *jizya* taxes in 1699–1700[8]. All these seem to be effective autonomous taxes in the sultanate of Ahmet III. F-test results for the analysis are 6.44 for the full sample period. This value of the F-statistics reject the null hypothesis that all the sultanate periods were the same. It can be interpreted that sultans applied different policies in their reigns and each sultan had different characteristics in his time interval.

Figure 1: *Revenue and Expenditures of the Ottoman Budget in Logarithms (1680–1747)[9].*
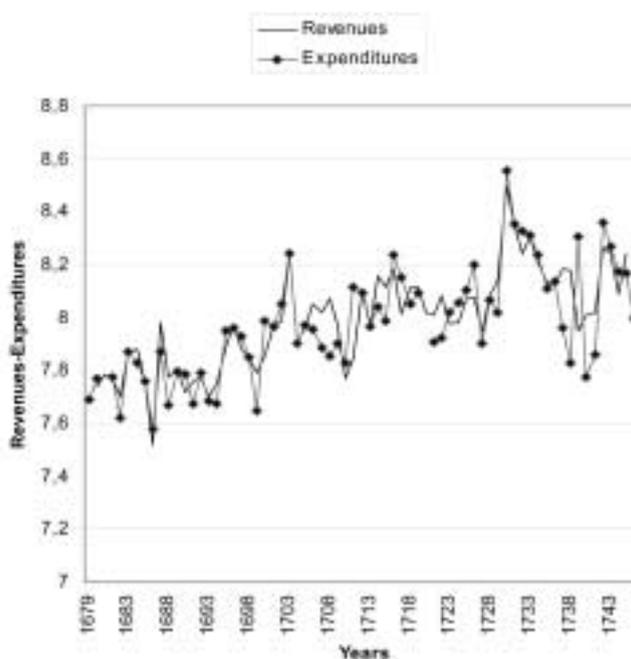
Table 2: *Revenues–Expenditures Relationship Across Different War Periods.*

Period	Constant	Expenditures	SSR
Vienna to Karlowitz (1683–1699)	6.576[**]	0.622	214.214
	(1.502)	(2.428)	
Karlowitz to Pasarowitz (1699–1718)	5.855[**]	0.683	306.100
	(1.742)	(3.462)	
Ottoman–Iran War (1723–1746)	−0.619	1.055[*]	421.711
	(−0.106)	(3.206)	

Note: [*]   *Indicates a significance level of 10%.*
[**]   *Indicates a significance level of 5%.*
      t–statistics are reported in parentheses under the corresponding estimated coefficients.

As the discussions above make clear, not the different sultanates but the different war periods were the reason for the fiscal policy action that was taken for the sustainability of budgets. The sample period is divided into three intervals: the Vienna Siege to Karlowitz (1683–1699), Karlowitz to Passarowitz (1699–1718), and the Ottoman–Iran War (1723–1746). This division is based on main characteristics of the war periods. The first interval, Vienna Siege to Karlowitz (1683–1699), was a period of defeat and land losses. The second period, Karlowitz to Passarowitz (1699–1718), was a period of attempts to regain the lost lands, and the third interval was a successful war period in which new lands were gained in the east. After the Vienna siege, the central government levied a new tax, *imdadiyye*. Initially, this tax was collected to finance military expenditures in times of emergency and in long lasting war periods. However, in a few decades it became a regular tax collected in various amounts, even in peace periods like from the 1700 peace with Russia to the Ottoman victory in Prut. As in the Tulip period (1706–1729), sometimes there were even excess revenues (*see the Figure 1*). When the war periods are considered in Table 2, in the first two war periods, the coefficients of expenditures were less than 1: 0.622 and 0.683. The period in which the coefficient of autonomous taxation was below zero is the war period with Iran. There were some fiscal advantages of wars in the east, which can be mentioned as important reasons for the lower autonomous taxes. These advantages can be explained as follow. After defeats in the west, *Janissary* revolts stared in

Rumelia, was easily extended to the capital, Istanbul. These revolts ended with either *julus* payment or other extraordinary payments made to the *Janissaries*, which affected the budget deficit sustainability negatively. On the other hand, for any war in the east, such a revolt extending to the capital was not possible. In addition to these, during the Iranian war period in the east, there were sizeable land gains, despite temporary and small land losses, which did not influence either *mukataa* revenues from the eastern provinces or any other revenues like *jizya* and *Avariz*. There were not any tax revenue problems in war times in the east. During these wars, in contrast to contrary to the western provinces, there were not any tax–exemptions or delays made by the central government. These are advantageous factors for budget deficit sustainability. The highest coefficient estimated for expenditures is the coefficient of the third war period, the Ottoman–Iran War (1723–1746) in the east, which is 1.055. When we examine the autonomous taxes in the three war periods, we see these coefficients for the three war periods: The estimated coefficients are for Vienna–Karlowitz (1683–1699), 6.576; for Karlowitz–Pasarowitz (1699–1718), 5.855; and for the Ottoman–Iran War (1723–1746), −0.619. Among these, the lowest coefficient for the autonomous taxes is −0.619 for the Ottoman–Iranian War period. This interval was a successful time for the Empire because besides victories, many peace treaties were made. In this time, wars with Iran, Austria, and Russia were generally successfull. The Belgrade Treaty with Russia and Austria (1739), the Hemedan Treaty and the treaty after the Musul War (1746) with Iran seemed advantageous for the Empire. The impression gained from the analysis of the war periods is an unsustainable budget deficit that cannot be recovered or mitigated by the short–term deficit sustainability. Moreove, war periods exhibit different characteristics either from both other periods or each other. The F–test values are 228.993 for the war periods in Table 2 and 294.6077 in Table 3, which are statistically significant.

Table 3 summarises the direct comparisons of deficit sustainability and autonomous taxation during war periods. In this regression D_t represents the war periods and $D_t * Expenditures_t$ represents the expenditures made in these war periods. It is understood from the estimated coefficients of *Expenditures*$_t$ that expenditures decreased in all of the three war periods. Especially in the Karlowitz–Pasarowitz (1699–1718) period, the estimated coefficient for *Expenditures*$_t$ retrogressed to a negative value, −0.177.

During the Siege process, taxes were collected by the army from the provinces along the road to Vienna. In the next war period, Karlowitz–Pasarowitz (1699–1718), *jizya* taxes were not collected from some provinces in Rumelia especially Tamishvar, Belgrad, and Bosnia for several years[10]. In this period, as mentioned above, revenues from some provinces did not reach the central budget because of the needs of the army during the military expedition. As a result of these, there was a decrease in the coefficient of autonomous taxes from 13.571 in the Vienna–Karlowitz period to 11.670 in the Karlowitz–Pasarowitz period. The lower coefficient of the interval of the war with Iran can be related to the accelerated decentralisation of provinces and local revenues during the war times of the transformation period. Although the autonomous tax for the first two periods were the same, it is lower in the Karlowitz–Pasarowitz period. This was a period in which many lands in Rumelia mutually changed hands with Austria. During these temporary gains and losses, the collection of the revenues was disorderly and autonomous taxes decreased. All these indicated that in war periods, there was a tax income loss while the war expenditures were continuously growing, which is one of the factors that makes the deficit sustainability problem of the Empire more serious in that period.

Table 3: *Revenues–Expenditures Relationship for Each Different War Period.*

Period	Constant	Expenditures	D_t	D_t* Expenditures	SSR
War with Iran (**1723−1746**)	13.725**	0.215	−0.978	0.084	613.456
	(27.574)	(7.357)	(−1.132)	(1.702)	
Vienna to Karlowitz (**1683−1699**)	13.571**	0.241	−3.529**	0.177	612.808
	(30.905)	(9.533)	(−3.463)	(2.975)	
Karlowitz to Pasarowitz (**1699−1718**)	11.670**	0.345	2.972**	−0.177	645.723
	(23.134)	(11.892)	(3.485)	(−3.575)	

Note: *   Indicates a significance level of 10%.
      **   Indicates a significance level of 5%.
          t–statistics are reported in parentheses under the corresponding estimated coefficients.

The empirical evidence elaborated on above suggests that both the Mahmut I era and the Iranian war period had a favourable budget management. In

order to assess which of these two was the main reason for the favourable environment we estimate the Equation 2 for Iranian war period (1723–1746) by adding a dummy variable for the Mahmut I era. The estimates are reported in Table 4. Note that the induce revenue is 0.697 for the non– Mahmut I era and 1.490 (0.697 + 0.793) for the Mahmut I era. This clearly suggests that Mahmut I, not the Iranian war era provided the sustainable budget. Furthermore, it is interesting to note that autonomous revenue decreased in Mahmut I era but this might be considered as favourable in the view of the taxpayers relative to for the Ottoman economy as a whole.

Table 4: *Mahmut I in the Iranian war period.*

	Constant	Expenditures	$D_{Mahmut–Iran}$	$D_{mahmut–Iran}$* Expenditures	SSR
War with Iran (1723-1746)	4.922**	0.697	−13.892**	0.793	986.649
	(1.668)	*(4.120)*	*(−10.050)*	*(9.745)*	

Note: * Indicates a significance level of 10%.
    ** Indicates a significance level of 5%.
    t-statistics are reported in parentheses under the corresponding estimated coefficients.

Table 5 analyses the connection between *julus*, the payment made to *Janissaries* when a new sultan is crowned, and deficit sustainability. The coefficient of the constant term for the *julus* payment period is lower, so there is a decrease in autonomous revenues. These payments seem to worsen the deficit sustainability. However, induced expenditures increase with *julus*. F-test value of the *julus* payment dates reported in Table 5 is 9.58, which is statistically significant. It indicates that julus payments led to changes in the fiscal dynamics of the Empire.

Table 5: *Revenues–Expenditures Relationship for Julus Period.*

	Constant	DC_t	Expenditures	DC_t* Expenditures	SSR
Full Sample Period (1680–1747)	12.844**	−2.831**	0.276	0.163	654.369
	(30.467)	*(−1.698)*	*(11.314)*	*(1.708)*	

Note: * Indicates a significance level of 10%.
    ** Indicates a significance level of 5%.
    t–statistics are reported in parentheses under the corresponding estimated coefficients.

As it was elaborated on earlier in this section, one might argue that budget sustainability cannot be interpreted through the estimated coefficient of *Expenditures*$_t$, but that the autonomous taxation should also be taken into account. In order to address this issue, we regress expenditures–revenue ratio on the constant for the full sample as well as the sub–samples used in Tables 1–2, and the dummy variables used in Tables 3–5. Interestingly, all constant terms for these periods are greater than one (Table 6) and none of the estimated coefficients of the dummy variables are statistically significant at the 10% level. This might suggest the sustainability of the budget. However, autonomous taxation is not proportionate to expenditures, so deficit sustainability in the long–run, is in question.

Table 6: *Estimation of Budget Sustainability by Using (Revenues/Expenditures) Ratio.*

	Constant	Djulus	DI*Expenditure	DMI	SSR
Full Sample	1.025**				52118.230
	(3.577)				
Mehmet IV	1.017*				5140.250
	(1.243)				
Suleyman II	1.006				2281.307
	(0.937)				
Ahmet II	1.006				3052.674
	(0.829)				
Mustafa II	1.025*				5091.085
	(1.517)				
Ahmed III	1.038**				26695.680
(2.068)					
Mahmut I	1.032**				36239.240
	(2.801)				
Vienna to Karlowitz	1.011*				11729.790
	(1.768)				
Karlowitz to Pasarowitz	1.034*				20892.570
	(1.785)				
Ottoman–Iran War	1.024				13421.610
	(2.479)**				
Julus Periods	1.026**	−0.091			52071.190
	(3.439)	(−0.008)			
Expenditures & Iranian War	1.026**		−0.025		52106.52
	(2.879)		(−0.004)		
Mahmut I during the Iranian war	1.026**			−0.033	52102.59
	(3.120)			(−0.005)	

Note: *   *Indicates a significance level of 10%.*
    **   *Indicates a significance level of 5%.*
         t–statistics are reported in parentheses under the corresponding estimated coefficients.
         DI: *Dummy variable set in the Iranian war era.*
         DMI: *Dummy variable set in Mahmut I's Sultanate during the Iranian war.*

If one considers that the budget was sustainable we consider this with the expenditures–revenue ratio, then the best terms of the periods are associated with the lowest constant and the highest slope terms. Similarly, the worse terms are associated with the highest constant and lowest slope terms.

To sum up, as a result of the evaluation of the regression results, we can argue that a general unsustainable budget deficit dominates in the sample period. The only fiscal recovery in real terms is in the sultanate of Mahmut I.

5. Conclusions

In this paper budget deficit sustainability has been examined during one of the transition periods (1680–1750) of the Ottoman Empire. 1680 was chosen as the starting point because it coincides with the beginning of the decline period of the Empire. Examining this period provided an opportunity to observe the effects of wars, as well as political and fiscal system changes upon the central budget and deficit sustainability.

The empirical evidence gathered in this paper suggests that during the sample period, except for the sultanate era of Mahmut I, the Ottoman budget was not sustainable. The other interesting result of the study is that *julus* payments have a significant tax increasing effect and the distribution of *julus* deteriorated the sustainability of the budget.

When we consider the other sultanate eras and war periods, we see the coefficients of expenditures are less than one in Table 1 and Table 2, which underlines the view that serious unsustainable budget deficit problems cannot be eliminated, even with small recoveries and a few sustainable deficit periods. At the end of the sample in 1747, fiscal problems became even more serious. The first foreign debt was undertaken in 1854 and the creditors established a foreign debt management system (*Duyun–u Umumiyye*) in 1881. Furthermore, the heavy fiscal problems of the Empire remained unsolved, affecting the economy of the new Turkish Republic from the dissolution of the empire to the second half of 1950s. The actual end of the fiscal problems of the empire was 1954, the year in which the young Turkish Republic paid the last instalment of the Empire's foreign debt.

NOTES

1. The data set is reported in the Appendix A.

2. All the Ottoman names and terms written in italic are explained in the Appendix B.

3. Marsigli G., Osmanli Imparatorlugu'nun Zuhur ve Terakkisinden Ihiati Zamanina Kadar Askeri Vaziyeti, pp. 294, Ankara (1934).

4. Nuri M., Netayicu'l–vukuat, V. II, pp. 88, Istanbul (1909).

5. One may look at Pamuk (1990) for details

6. Griffths, Hill, and Judge, Learning and Practicing Econometrics, pp.411–424, U.S.A (1992).

7. Tabakoglu, pp 117–119, Istanbul (1985).

8. Tabakoglu, pp. 136–7, Istanbul (1985).

9. Barkan O.L., 1669–70 Ottoman Budget and Its Extensions, IUIF . M.C. XVII, No: 1–4, pp 225–303, Istanbul (1960).

   MM.22249, pp 121–130 1687–88 Budget

   Kepeci, 2313; MM22249, pp. 131–136, 1690–91 Budgets

   1691–92 Budget, MM the same notebook, pp. 137–149; MM. 12 603 (Budget)

   1692–93 Budget MM the same notebook, pp.150–157.

   1693–94 Budget MM the same notebook, pp. 158-164

   1693–94 Budget MM the same notebook, pp. 38–43

   1696–97 Budget MM the same notebook, pp. 44–53; Cevdet, Maliye,

   1698–99 Budget MM the same notebook, pp. 54–56, pp. 66–79

   1700–01 Budget MM the same notebook, pp. 80–105

   1701–2 Budget MM the same notebook, pp.106–120, Kepeci, 2324 (Budget)

   1703–4–5, 1710–11 Budget MM the same notebook, pp.1–37, MM.15 724.

10. Mud. 111, pp. 694, 1 113/30, VI,1701.

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APPENDIX A: Terms and Concepts[*]

Akche: Ottoman monetary unit based on silver.
Avariz: A tax levied in extraordinary situations, especially in war times. It could be in cash or in agricultural products.
Ayan: Local governor.
Jelali: Tradesman
Jizya: A tax collected from the non-Muslims living in the empire on per capita basis.
Julus: Payment made to Janissaries when a sultan starts reigning.
Hass: Personal prosperity of the sultan.
Iltizam: Tho Ottoman land code of 1858 also sought to modernize the goverment's revenue collection.
Imdadiyye: A tax levied in extraordinary situations. When cash was needed, the tax was collected from the wealthy people of the Istanbul.
Janissaries: Permanent and horseless army of the Ottoman Empire; the crucial part of the Kapikulu soldiers.
Mevacip: A payment made to the Kapikulu soldiers (the main part of the Ottoman Army which consists of infantry soldiers, Janissaries and soldiers with horse) four times a year in hicri months Muharrem, Rebiulahir, Recep, and Sevval.
Mukataa: A production method that was operated by collecting revenues of the central administration or taking operational rights of some monopolies (like a mine or minting coins) or being the only purchaser of some producs.
Nuzul: This is an extraordinary tax collected in war times from the cities and villages along the road of the military expedition. Nuzul was a tax generally based on flour and barley collected per household. The tax could be converted into services needed by the army or cash.
Ruznamce: Notebooks containing daily entries of the imperial budget.
Sursat: This was an application put into practice especially in war times. It was an obligation for subjects of the Empire which made them responsible for supplying feed for horses, food and firewood for the army at a determined price. This tax could be collected as cash when needed.
Timar: In this system, there was no fed army. Instead of agricultural lands are given to janissaries in order to be cultivated during the times rest of the wars.
Waqf: Judicial personalities performing for charity.

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[*] *For other terms and concepts see Midhat Sertoglu, Osmaldi Tarih Lugati (1986).*

APPENDIX B: Budget Revenue and Spending of the Empire

Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures
1090M1	N/A	7482570	1092M7	9830029	15120899	1095M1	3379077	3555648	1097M7	24166551	31513715
1090M2	N/A	45502424	1092M8	9830029	47393199	1095M2	6081750	60637	1097M8	7740476	12755516
1090M3	N/A	2494295	1092M9	82838420	31034158	1095M3	66636338	92354707	1097M9	14484833	37023256
1090M4	N/A	34720715	1092M10	20825106	29921465	1095M4	55160428	65869404	1097M10	N/A	N/A
1090M5	N/A	72431737	1092M11	30302883	67334677	1095M5	53219003	43790646	1097M11	8454614	4645460
1090M6	N/A	6327625	1092M12	67022931	100293112	1095M6	54716882	33605990	1097M12	4697085	39794288
1090M7	N/A	11540555	1093M1	40472252	9713435	1095M7	17140579	33364089	1098M1	21756890	17240139
1090M8	N/A	59217362	1093M2	45307959	7442177	1095M8	76792035	62759074	1098M2	6263087	7636185
1090M9	N/A	68130606	1093M3	14604116	49750978	1095M9	44422844	30943593	1098M3	35324532	14697788
1090M10	N/A	15796265	1093M4	20921234	13171376	1095M10	56538076	37534385	1098M4	2723576	13620518
1090M11	N/A	40545460	1093M5	49408388	5076789	1095M11	60808234	101821134	1098M5	21231978	2587753
1090M12	N/A	48441321	1093M6	18566514	49840097	1095M12	23981486	19506343	1098M6	23955432	147968652
1091M1	37888570	6064746	1093M7	41391374	19968668	1096M1	59559149	35624382	1098M7	51347540	28546689
1091M2	30962142	53887831	1093M8	9116450	36909224	1096M2	108931705	55609353	1098M8	16640653	20973960
1091M3	15270107	17841748	1093M9	128185614	71794127	1096M3	12258057	43440991	1098M9	2759106	8403777
1091M4	59592517	26313757	1093M10	17878069	31749415	1096M4	11071982	28286134	1098M10	N/A	N/A
1091M5	36473117	49896326	1093M11	9575474	36285011	1096M5	25115625	29734381	1098M11	12390495	909537
1091M6	7299133	7521112	1093M12	27998446	89246673	1096M6	22041405	57591466	1098M12	1073163	765736
1091M7	37099649	18436380	1094M1	17530588	3831131	1096M7	36108705	67926590	1099M1	190197172	6783627
1091M8	41388366	75446732	1094M2	27436265	23478520	1096M8	35636055	26409358	1099M2	20402771	4844898
1091M9	87408019	62803789	1094M3	64506962	59287576	1096M9	145150373	104346197	1099M3	74114861	128788791
1091M10	23744083	91517111	1094M4	63170496	21805202	1096M10	5489739	1765640	1099M4	38925227	35945150
1091M11	21711708	44229022	1094M5	110106470	46127313	1096M11	66647759	33960751	1099M5	31237951	40182452
1091M12	18754190	29381167	1094M6	9694625	9697554	1096M12	10824912	18700426	1099M6	29024762	15888712
1092M1	47613856	26800646	1094M7	2894800	31381120	1097M1	41961880	86107695	1099M7	26696549	32964361
1092M2	14676313	6235452	1094M8	2931729	79255609	1097M2	55317557	23751559	1099M8	69847800	28892568
1092M3	20953821	9138308	1094M9	34677480	30898783	1097M3	27987830	42740935	1099M9	37444068	24078991
1092M4	39802867	28500596	1094M10	6634540	6286318	1097M4	73111655	40227701	1099M10	124463944	28382095
1092M5	12818812	42266935	1094M11	29927094	2934731	1097M5	174281526	136696114	1099M11	26540414	33192300
1092M6	56887861	30707696	1094M12	24747157	9584405	1097M6	24347096	13358335	1099M12	12695195	152952280

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1100M1	4863289	1925280	1102M10	26295622	24381822	1105M7	34301913	20531915	1108M4	46620496	52905843
1100M2	10988698	17741742	1102M11	16295870	66959298	1105M8	32034668	60817532	1108M5	22636255	10237372
1100M3	48101441	34232817	1102M12	9777700	58080621	1105M9	31047020	27598431	1108M6	40174186	24901444
1100M4	65898141	33681171	1103M1	26251236	5610593	1105M10	73979976	116482641	1108M7	64862343	107254840
1100M5	54852389	29626164	1103M2	46622175	62706095	1105M11	18973753	7231009	1108M8	43131371	34701288
1100M6	49789739	29313589	1103M3	63421074	7977671	1105M12	2093165	3809120	1108M9	44635053	25329551
1100M7	30745668	49167813	1103M4	54554429	64355711	1106M1	2282231	17380506	1108M10	133868590	115443958
1100M8	36466731	48255150	1103M5	49908126	25539019	1106M2	524766	1625913	1108M11	99330284	115443958
1100M9	36283923	21168351	1103M6	33416238	101002020	1106M3	35329762	39515900	1108M12	69514282	56181126
1100M10	28726957	40994777	1103M7	35667404	19279515	1106M4	44727421	472584	1109M1	40164449	5868211
1100M11	28726957	14134866	1103M8	24092510	32828084	1106M5	41145336	153511372	1109M2	33151235	52627866
1100M12	15822706	13567456	1103M9	135409824	55924630	1106M6	16236156	11904878	1109M3	67559403	39179563
1101M1	3916921	84237346	1103M10	54648649	38257339	1106M7	28759630	13044411	1109M4	50592181	55438362
1101M2	118889806	8970564	1103M11	6548771	2786102	1106M8	67343187	51143334	1109M5	56952425	11661807
1101M3	25823166	21773076	1103M12	5240769	6662661	1106M9	36852242	19765074	1109M6	51019610	96885092
1101M4	76099616	82850781	1104M1	17461171	6639862	1106M10	49365261	13558857	1109M7	49172523	40881323
1101M5	113684111	87434812	1104M2	22661541	35925563	1106M11	90426611	26471401	1109M8	48257890	189821452
1101M6	52980516	94226779	1104M3	23151990	23611725	1106M12	3184398	12850273	1109M9	66555664	24945285
1101M7	7573425	16350294	1104M4	44433259	29186790	1107M1	12981511	57052065	1109M10	48242473	45697969
1101M8	15528473	16350294	1104M5	99610039	91800304	1107M2	7.441E+09	18022201	1109M11	28340824	12153383
1101M9	30547204	22604931	1104M6	90520356	61915432	1107M3	73841495	108692290	1109M12	27915579	58703850
1101M10	26845447	24091346	1104M7	31943853	75622596	1107M4	21702467	5028041	1110M1	25133199	72351570
1101M11	10153987	6026184	1104M8	37879584	4247413	1107M5	106590443	54434814	1110M2	26942155	17399350
1101M12	1177043	14301323	1104M9	36687040	13259684	1107M6	49759098	3785328	1110M3	14147396	11862083
1102M1	30566338	13079477	1104M10	30926163	57258868	1107M7	70562486	23254679	1110M4	23094315	98249878
1102M2	701320	12516220	1104M11	44404573	44404573	1107M8	50953877	13862384	1110M5	33699217	44952039
1102M3	127971290	23346891	1104M12	4752048	15708826	1107M9	79464639	326534693	1110M6	101920828	6686268
1102M4	19459245	11378514	1105M1	722395	19818721	1107M10	70505353	53443331	1110M7	62274879	76358975
1102M5	79452219	65393157	1105M2	6124224	21428922	1107M11	47577340	20082346	1110M8	19066548	16390331
1102M6	45067076	32946964	1105M3	45372906	33221932	1107M12	22891884	23740727	1110M9	158077100	83469409
1102M7	50881270	116489164	1105M4	52960416	19490846	1108M1	33181839	29898037	1110M10	N/A	N/A
1102M8	43967700	10459952	1105M5	31452823	17929310	1108M2	12895306	30102963	1110M11	29195249	87080780
1102M9	48237185	52657408	1105M6	38103034	10225926	1108M3	66545143	96570346	1110M12	20827484	7055407

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1111M1	14452737	20616427	1113M10	26674421	21577843	1116M7	47412155	24754539	1119M4	32715105	2178077
1111M2	30605726	6330035	1113M11	47094133	90167487	1116M8	66912008	29588910	1119M5	20951220	4286819
1111M3	13319654	22718904	1113M12	17006346	15823351	1116M9	108098799	199142828	1119M6	54567721	88211085
1111M4	22186929	6202637	1114M1	13568192	31744381	1116M10	16660885	131618473	1119M7	55360056	1658493
1111M5	82364075	112616949	1114M2	7150781	6294422	1116M11	11596949	3997608	1119M8	39847707	9789881
1111M6	45768256	12657678	1114M3	18067164	20151487	1116M12	11853634	15088247	1119M9	144458719	108942505
1111M7	41235623	34052386	1114M4	9476200	39662237	1117M1	12115276	26013763	1119M10	42209301	2088531
1111M8	22526536	2223411	1114M5	2954864	1567590	1117M2	7346551	5255566	1119M11	32026002	77817804
1111M9	78253887	88480431	1114M6	98043132	59442821	1117M3	9020616	6040389	1119M12	70115088	1199335
1111M10	70351343	43204071	1114M7	42104704	87163918	1117M4	46874159	1121972	1120M1	34296671	1706651
1111M11	37911834	9592902	1114M8	46230073	71750831	1117M5	79723331	14173554	1120M2	26216463	87577319
1111M12	25992567	9152110	1114M9	135139029	98831219	1117M6	81754560	129956536	1120M3	36623960	13707896
1112M1	47205405	173758828	1114M10	25358067	3535654	1117M7	16468183	85659003	1120M4	69560676	4469785
1112M2	38176986	6762991	1114M11	47507907	46322033	1117M8	52914023	6095619	1120M5	78188704	649511
1112M3	13154070	167751675	1114M12	28492048	96531695	1117M9	159665238	127572787	1120M6	67234323	3291691
1112M4	20612071	13955216	1115M1	10499956	9057601	1117M10	17851281	4231778	1120M7	35752414	1151705
1112M5	42517972	14771021	1115M2	20611781	5397280	1117M11	15210347	10462752	1120M8	87953324	94778700
1112M6	64973471	74164398	1115M3	39166831	17103265	1117M12	14030888	105633423	1120M9	96220271	2390391
1112M7	46398022	7319237	1115M4	213415413	71183475	1118M1	3139411	7424433	1120M10	19548457	2812799
1112M8	27656512	21925707	1115M5	83469691	47800473	1118M2	11296185	33472866	1120M11	48696907	195532375
1112M9	86410750	102488365	1115M6	146806302	222713382	1118M3	6915283	6988429	1120M12	71444255	1107961
1112M10	49890758	80522551	1115M7	63732688	154474551	1118M4	20479637	7331642	1121M1	49062855	3990068
1112M11	25088952	7147317	1115M8	36845629	37694196	1118M5	24360202	504477	1121M2	21917880	89651159
1112M12	37846083	4731545	1115M9	240680077	65754803	1118M6	139429101	2024503	1121M3	53057142	7129937
1113M1	24601021	13070551	1115M10	208177220	242998582	1118M7	43170389	193092876	1121M4	34427563	6949014
1113M2	28181306	3993522	1115M11	28085570	20480226	1118M8	36527400	8858702	1121M5	51230660	6287204
1113M3	27395382	7570168	1115M12	23442948	36729191	1118M9	176995317	187099347	1121M6	65346243	6095931
1113M4	13422016	8873414	1116M1	11162032	5910066	1118M10	32474758	10276369	1121M7	10828948	6253702
1113M5	53754496	5535525	1116M2	7596324	7835821	1118M11	32718302	31046210	1121M8	33864099	96299551
1113M6	58616841	54622810	1116M3	41464685	34516640	1118M12	64336680	8245588	1121M9	93402169	8437756
1113M7	23822061	9854155	1116M4	35805619	3351886	1119M1	43109819	12290032	1121M10	31231678	2288184
1113M8	34340699	74969196	1116M5	76031970	6818953	1119M2	32462213	19922468	1121M11	21884369	198969195
1113M9	103156578	161114811	1116M6	111687083	132857783	1119M3	5685213	2947049	1121M12	49507694	6369529

Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures
1122M1	26292632	4535925	1124M10	104146746	109449431	1127M7	4825054	29089304	1130M4	91538087	114128121
1122M2	27737638	28582604	1124M11	26634750	261168579	1127M8	6752269	12232427	1130M5	124846284	122094049
1122M3	27324552	91206425	1124M12	56616602	18762940	1127M9	12492487	186621664	1130M6	48711252	19113372
1122M4	17803002	11290843	1125M1	20477979	13085628	1127M10	284562925	28930402	1130M7	41575545	5981092
1122M5	26734205	8744548	1125M2	59202325	59008612	1127M11	175069594	11828940	1130M8	47041827	135085863
1122M6	39791185	90930386	1125M3	9009240	24321270	1127M12	116299265	13740924	1130M9	44290835	4198862
1122M7	26249707	6709068	1125M4	8745736	16558032	1128M1	103561797	28148930	1130M10	76670810	4712117
1122M8	26520062	7749425	1125M5	120926939	73768449	1128M2	55839459	55839459	1130M11	40234142	1197328
1122M9	80432665	6676155	1125M6	62219505	21406157	1128M3	139532830	449848126	1130M12	82829114	70271834
1122M10	26015667	197083490	1125M7	51797060	8243734	1128M4	146443624	167304245	1131M1	42474001	27846179
1122M11	21845512	27673168	1125M8	41510977	6163650	1128M5	24345195	76197682	1131M2	46168289	8646145
1122M12	38237742	15079212	1125M9	257964924	31608031	1128M6	72692659	23508469	1131M3	35410290	134858598
1123M1	10292068	64589416	1125M10	30134040	80643040	1128M7	24775995	35659239	1131M4	32947206	24451046
1123M2	24351585	104828298	1125M11	45194329	30017751	1128M8	23821186	77857778	1131M5	63167075	79332403
1123M3	17025252	119431373	1125M12	120411718	65859070	1128M9	20039352	42690008	1131M6	157330564	126039656
1123M4	12080481	67526651	1126M1	89726510	18987716	1128M10	133648654	87849917	1131M7	81502886	159739960
1123M5	6407250	59260049	1126M2	36661624	118630632	1128M11	191525829	104166723	1131M8	97504588	115772301
1123M6	10115364	16565621	1126M3	94538276	25815278	1128M12	76142532	62756041	1131M9	66598296	2013663
1123M7	67441243	72227220	1126M4	70579147	58147776	1129M1	78456336	288257493	1131M10	46738599	9184615
1123M8	31209714	30967761	1126M5	110925251	47972377	1129M2	37117876	19088517	1131M11	38860059	5704169
1123M9	134640284	258409930	1126M6	112034006	19228757	1129M3	59668793	36931242	1131M12	55743818	41787744
1123M10	20350072	10617529	1126M7	55978170	137150376	1129M4	72165698	17359117	1132M1	38985527	5444409
1123M11	15108574	78582254	1126M8	106113937	42685421	1129M5	107245901	56340083	1132M2	25969679	12191131
1123M12	40011561	10903167	1126M9	153340504	221122203	1129M6	96603054	95517249	1132M3	108685526	114927506
1124M1	103864699	22899600	1126M10	84582582	30715020	1129M7	21479012	241128612	1132M4	10432401	8302074
1124M2	49952599	51217213	1126M11	76724343	19671093	1129M8	8301680	39900648	1132M5	68940495	N/A
1124M3	69978482	129232504	1126M12	72077831	75794137	1129M9	16800131	31949467	1132M6	56363988	N/A
1124M4	46335347	9559950	1127M1	60514582	39167438	1129M10	701319	28831440	1132M7	60708252	N/A
1124M5	66677159	54392382	1127M2	57872542	35404257	1129M11	103485087	5176206	1132M8	139878734	N/A
1124M6	34455482	3795666	1127M3	45373089	46820199	1129M12	91783599	92633843	1132M9	23078521	N/A
1124M7	27646940	128206159	1127M4	164045477	175322377	1130M1	62542089	77389328	1132M10	57108697	929432
1124M8	54289401	3912895	1127M5	6138024	53362710	1130M2	138885574	50487948	1132M11	46179034	1302150
1124M9	178006181	4840229	1127M6	4459477	12807057	1130M3	96702447	162470302	1132M12	89797727	N/A

Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures
1133M1	39132851	4546291	1135M10	38423776	27730093	1138M7	159742586	139690920	1141M4	109241494	70513361
1133M2	42410415	3793068	1135M11	57860375	30738642	1138M8	160366634	81518911	1141M5	56616385	15750070
1133M3	40001629	219659036	1135M12	63341037	4604500	1138M9	23853582	118639981	1141M6	95245826	426954523
1133M4	56738848	2701315	1136M1	54442725	227083027	1138M10	19315057	25980099	1141M7	71056997	16826431
1133M5	74153910	5239080	1136M2	48319462	11170418	1138M11	50578743	23629754	1141M8	263643576	242724193
1133M6	32602848	116093536	1136M3	49697175	102801021	1138M12	167850661	196801087	1141M9	24069078	6922419
1133M7	65289820	11701594	1136M4	88008324	31577536	1139M1	58155584	34801127	1141M10	30409084	15744402
1133M8	113880563	16607290	1136M5	54397797	75264456	1139M2	51687970	21100815	1141M11	100360508	18738709
1133M9	38438347	12707037	1136M6	28371770	28242550	1139M3	14874525	35175824	1141M12	89441008	7664554
1133M10	57185249	16112464	1136M7	49394558	9296922	1139M4	65793193	16560265	1142M1	79903126	4300585
1133M11	27484228	112247869	1136M8	125587636	27657658	1139M5	49895289	207710731	1142M2	49273268	114900998
1133M12	86502235	9679794	1136M9	12686786	3801504	1139M6	104512139	29613436	1142M3	63292641	13269668
1134M1	49292192	3399513	1136M10	17588535	12073620	1139M7	191174511	304882925	1142M4	92700383	21198665
1134M2	119488749	213316153	1136M11	44931159	145550039	1139M8	29397238	6724169	1142M5	92575607	112313785
1134M3	61895508	4866528	1136M12	59357129	47568295	1139M9	53856343	26210154	1142M6	8896145	4464830
1134M4	82134816	4910310	1137M1	72630980	15475142	1139M10	33393983	154091826	1142M7	54177124	5019490
1134M5	86717160	6099734	1137M2	42805120	28008459	1139M11	79112178	52190528	1142M8	127833052	240683290
1134M6	42780394	120057789	1137M3	31628295	7958393	1139M12	64111799	99885973	1142M9	20182374	10248263
1134M7	66620423	9057014	1137M4	56327744	202899995	1140M1	17087834	15083700	1142M10	31060427	49792370
1134M8	98578735	6222787	1137M5	55391000	49875067	1140M2	68708752	19526057	1142M11	56150364	11928503
1134M9	23316331	3154957	1137M6	23342106	132920759	1140M3	48394334	93820162	1142M12	101077681	68101079
1134M10	39048746	17108989	1137M7	105329599	79945884	1140M4	16004744	187718243	1143M1	101442250	151168971
1134M11	68269328	16627379	1137M8	136551820	18042657	1140M5	12825195	11026372	1143M2	23360305	17946889
1134M12	90137115	129154645	1137M9	25548283	51755568	1140M6	36979795	6634538	1143M3	27222466	88543502
1135M1	55765551	4547254	1137M10	32312279	52678348	1140M7	189626119	9350065	1143M4	44215957	23439385
1135M2	23835475	208731710	1137M11	34205436	59490833	1140M8	24545494	107471195	1143M5	43480728	44070205
1135M3	74022249	5352957	1137M12	73749066	113193787	1140M9	18168155	5600734	1143M6	133482341	64521809
1135M4	114429703	109504030	1138M1	38873349	10387104	1140M10	52571691	16701886	1143M7	1.426E+09	1.585E+09
1135M5	37632237	10513505	1138M2	31925951	15097777	1140M11	52571691	18534168	1143M8	369575359	551290496
1135M6	42812708	25502641	1138M3	24450190	8139772	1140M12	59423725	108109564	1143M9	71009086	37952223
1135M7	47530190	18107469	1138M4	65028552	228109038	1141M1	85238470	78728438	1143M10	43994670	58745750
1135M8	148909946	106884255	1138M5	54197030	6901386	1141M2	27532590	51367234	1143M11	91507868	165227880
1135M9	44736892	14812119	1138M6	19858167	20279923	1141M3	28446052	17844006	1143M12	115315981	78761287

Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures
1144M1	78190578	76657756	1146M10	72764683	66984122	1149M7	186322562	154565899	1152M4	6248543	36877033
1144M2	30826430	266208564	1146M11	67152232	34225248	1149M8	18055107	2593797	1152M5	44744168	21760778
1144M3	378269896	195053212	1146M12	136863202	50865832	1149M9	31649601	179449560	1152M6	58050948	47162832
1144M4	80160488	48329602	1147M1	92981820	189487238	1149M10	14542914	26619135	1152M7	64910195	307157581
1144M5	79454045	200251399	1147M2	27962951	24284139	1149M11	31176804	31825027	1152M8	269717814	5849812
1144M6	35556479	39041264	1147M3	43684659	68279286	1149M12	399660098	346086122	1152M9	82259527	694908
1144M7	32271576	93278217	1147M4	140546694	76020042	1150M1	50118596	51485883	1152M10	84065839	63837900
1144M8	432485796	368855770	1147M5	110501710	7429270	1150M2	24292012	26570178	1152M11	66599088	437344775
1144M9	53328051	69830819	1147M6	118408097	231311230	1150M3	85976608	65132581	1152M12	29142962	21723115
1144M10	20671793	32416259	1147M7	94901093	30329391	1150M4	28270400	47503849	1153M1	120748815	6160565
1144M11	283877438	158002544	1147M8	253276771	63435624	1150M5	147469298	125261711	1153M2	128742688	19149674
1144M12	145432412	158253886	1147M9	40044856	49249879	1150M6	62432251	63967025	1153M3	61070306	57045378
1145M1	199773979	69202528	1147M10	71453114	119199022	1150M7	69948225	23438585	1153M4	17260499	7673858
1145M2	46354222	49032613	1147M11	27639669	25488077	1150M8	205477971	55668126	1153M5	60349923	4731274
1145M3	57538107	254800621	1147M12	54128455	279776625	1150M9	104129988	31875659	1153M6	102627134	216160295
1145M4	48119366	63674944	1148M1	99546061	27590351	1150M10	281534331	125101352	1153M7	152730527	25210861
1145M5	76623864	191702114	1148M2	159964081	147596974	1150M11	235538180	170432404	1153M8	292786753	235764632
1145M6	161820499	196657142	1148M3	117408911	97656560	1150M12	75212915	21436185	1153M9	39905698	17037676
1145M7	42500671	56802298	1148M4	67645488	192397693	1151M1	56056888	48928731	1153M10	46706109	787719120
1145M8	365382934	214292712	1148M5	49723424	3301908	1151M2	32364438	40535490	1153M11	35292263	31841534
1145M9	70033643	382554215	1148M6	94520495	26822455	1151M3	38257879	36411453	1153M12	51218172	6078875
1145M10	51716888	50302944	1148M7	89246735	168700577	1151M4	29357936	47580125	1154M1	108366166	93555077
1145M11	97188217	75726080	1148M8	228564968	316728321	1151M5	24704272	23192973	1154M2	148715017	205665493
1145M12	81762427	34459951	1148M9	22951189	3752093	1151M6	137198033	36337987	1154M3	57283701	13146385
1146M1	90510171	22232699	1148M10	27791433	1795398	1151M7	292923733	62571120	1154M4	38636107	5586590
1146M2	73567872	94872930	1148M11	40085545	5033495	1151M8	124961001	35859827	1154M5	111398799	3742793
1146M3	71218920	216126029	1148M12	75141965	6075399	1151M9	103088130	68993940	1154M6	132175435	127362931
1146M4	122434839	84843420	1149M1	43278908	162234974	1151M10	80995723	71843353	1154M7	234346601	198758966
1146M5	105839377	171502692	1149M2	111001201	33258915	1151M11	204711241	47538222	1154M8	479617872	32606246
1146M6	117710132	127726360	1149M3	73892372	26925978	1151M12	111744883	49374495	1154M9	44703520	29855466
1146M7	123604382	95639664	1149M4	33868871	36255663	1152M1	81102396	251682552	1154M10	16964148	11446585
1146M8	208414667	322444435	1149M5	23294677	9142730	1152M2	97799535	36707915	1154M11	36643073	24006798
1146M9	177061513	89644666	1149M6	116562575	106474140	1152M3	39558631	1.011E+09	1154M12	9140932	3145985

Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures	Hijri Years	Revenue	Expenditures
1155M1	70394879	353739503	1156M5	86859409	62195365	1157M9	88553154	55862269	1159M1	33530604	5483618
1155M2	267199365	185567116	1156M6	146646532	242661456	1157M10	27521987	12651771	1159M2	67265870	186632980
1155M3	440126627	441027968	1156M7	141697818	70912026	1157M11	54322067	42050021	1159M3	N/A	80196992
1155M4	221397752	137253090	1156M8	318115778	299971129	1157M12	120994411	482175708	1159M4	N/A	10817306
1155M5	91456888	114376642	1156M9	69694942	18047966	1158M1	69928206	52201026	1159M5	N/A	44289200
1155M6	112377597	44376063	1156M10	128169934	78460348	1158M2	187687309	48307252	1159M6	N/A	2626908
1155M7	107194827	53993719	1156M11	122806960	97935768	1158M3	96562593	231449479	1159M7	N/A	200401986
1155M8	236193874	184911546	1156M12	10771387	405198778	1158M4	40396058	49941068	1159M8	N/A	28842541
1155M9	28271689	1639410	1157M1	121200373	147782322	1158M5	98980930	42671970	1159M9	N/A	432621740
1155M10	62591189	59207922	1157M2	187225770	34011472	1158M6	158400025	212889286	1159M10	N/A	11647288
1155M11	15202513	506669	1157M3	29553949	13693413	1158M7	179428818	54540656	1159M11	N/A	2904309
1155M12	21885214	444849849	1157M4	55600229	44635624	1158M8	286184709	357376442	1159M12	N/A	1442545
1156M1	19420548	24890900	1157M5	119719185	236631705	1158M9	51750584	34069487			
1156M2	228330611	96677556	1157M6	126185351	52132139	1158M10	22609669	4488088			
1156M3	74922803	34873243	1157M7	116828570	192156844	1158M11	27074040	11567130			
1156M4	60535099	48913424	1157M8	220602459	32453372	1158M12	56381434	10956352			

THE EFFECT OF TAXATION ON NON–PROFIT ORGANIZATIONS AND THE GROWTH OF A SERVICE CONTRIBUTION OF FOUNDATIONS & ASSOCIATIONS

L. CONTOS-MANALIS[*]

Abstract

It is generally agreed among scholars that the impact of taxation on non–profit organizations relates more distinctly to tax and social analysis than to any other research. From such a viewpoint, one can study, in economic terms, a current social phenomenon, such as foundations and other social organizations, as it appears today in Greece. The general parts of our paper have focused on the following: a) the social forces and criteria, b) the emergence of economic and non–profit bases, c) the influence of taxation on the dynamics of foundations and other organizations, d) the exemptions of taxes and privileges, e) the limitation of tax exemptions, f) the correlation and interpretations and the conclusion. Concerning Greece, it must be stated that foundations and other associations are a public, a social or a religious idea, resulting mainly from private initiative. This brief description enumerates the different directions for our method of empirical analysis. The route of gathering information derives from different sources and relates to historical and economical data about the evolution of the institution of non–profit organizations through the impact of taxation.

JEL classification: H2, H3.
Keywords: Taxation, non–profit organization, evolution of foundations/associations.

1. Economic order and non–profit organizations

The meaning of speculation covers at first the business activities of the profit organizations. Consequently, the activities of non–profit fictitious persons can not be put in the context of speculation. Actually, through the objectives fictitious persons' purposes, we separate non–profit and benefit activities.[1] For this reason, the foundations, associations, church legal

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identities etc. are differently regarded by the tax laws of states compared to the non objective profit from the income and the proceeds of corporations and other companies. The impact of tax, in the opposite case, will be unacceptable.

Consequently, in the context of social life, persons join several law collaborations, connecting their efforts and the chance of money for a common purpose, which is not necessary profit. Logic and experience show that there are beneficial works that their claims and their duration, overcome the efforts of persons which are joined for the realization of the above no–profit purposes.[2]

However, the tax facing, is not always the same or is not as it should be, because the non–profit fictitious persons have completely inclining leanings from the profit by contrast with the commercial and industrial companies, where the speculation dominates[3]. Consequently, the question is, which is the criterion for the definition of meaning one fictitious person as non–profit and how the tax explains this criterion.[4]

Further, it must be noted, that the laws foresee and regulate several types of non–profit fictitious persons, because the law types that exist (civil companies, associations, foundations etc.) give their organizing contexts in activities that are structuring on the social utility services. From such a viewpoint, we are obliged into the economical purpose to search the pre–eminently non–profit, given that every economical purpose is not necessarily profit.[5] Especially, the dynamics of a "civil company" for the facing expenses that come from their benefit purposes and which express with intense economical action do not mean that it moves into profit contexts.

2. Social forces and criteria

According to the above remarks, we necessarily operate into meanings of fictitious persons and look for the element that will join the members for the realization of this purpose, which is not profit. Moreover, it is possible to remark, into a framework, the existence of a total property that for several reasons is given with a will[6] or with a donation. So, at the current formative action[7], we distinguish a foundation. For this reason, according

with the above findings, we cannot talk for profit or for damage for one non–profit fictitious person.

At first sight, it is understood that the economical purpose is a wider profit sense contained independently without the profit target. Actually, the economical action of a "civil company" or an association, at first, is spposed necessary, with reference to cover the expenses of the benefit purposes that this legal person aims. However, this does not mean that this differentiates the sense of purpose and puts this into a profit base.[8]

3. The emergence of economic and not–profit bases

When a legal person aims a certain civil purpose and mainly non–profit, removes and differentiates its orientation from the side of forwarding into area of social utility, that is opposite with the profit purpose.[9] With this differentiation, the dynamics of «associations» appears at first. It is about joining of persons that aim non–profit purpose, if the conditions of their formation according to the law apply. (Article 78 of the Greek Civil Code).

Besides, it must be noted, that the element prerequisites of the above article are, from the side of association, the aim non–profit. However, at this point, there must be a clarification. An association, as for example the vocational associations, when present to the members helping each other, can have a wider economical purpose, fact that does not modify the profit pursuit. The existence of economical surplus in the cash of association that comes from payments or donations, is emphasized on the economical purpose. However, this fact differentiates from the meaning of speculation.

The foundation is placed among the non–profit fictitious persons. According to the law (article 108 of the Greek Civil Code), an organization with wide meaning of the term, acquires legal nature and pursues a definite purpose, given that, for the furtherance of this aim, a will provided a property. The foundations that pursue beneficial purposes are also controlled in addition and from other rules. Furthermore, it must be noted, that the article 109, paragraph 1 of Constitution 1975/1986/2001, foresees for the "benefit foundations", giving protection for the inadmissible of the change in the "content" or in the "terms" of a will etc.[10] The essential content of the founding action concerns the purpose of a foundation, the

offering property and its organization. It makes clear that the purpose of the foundation can be public benefit[11], charitable, cultural, folklore etc., provided this does not breach the law.

In light of this, the imposition or not of taxes in the first place, must be looked at a general frame of the exemptions taxes, according with the tax laws of several states, in order to supervise the tax confrontation of the foundation according to the regulations of law that concern the income tax.

Actually, the exemption of taxes doesn't refute and detract the constitutional principle of the "taxation equality"[12] and the "generality of taxes", because the above principles of law, do not violate. Besides, any other exemption is not recognized apart from the above exemptions that are acknowledged by the law. The problem is that the changeability of the tax law compresses and reduces these exemptions and the result is the formation of functional problems.

4. Exemptions of taxes and privileges

Particular analysis is demanded for the exemptions that foresee several laws, but for the present will not be examined. The focal point is the frame of exemptions of article 103 of Greek Code of Revenue (Law 2238/1994). In the first place, for financial reasons, we remark the exemptions of the state which include and the public utility services (e.g. public services that operate as special decentralized offices, such as municipalities and communities, such as municipal and communal foundations or such as municipal and communal legal persons or such as unmixed municipal and communal beneficial companies of water supply, drains and handling of rubbish or tele–warming etc.).[13]

Consequently, controlling the article 103, paragraph 1 of Law 2238/1994, in the first place, we report the frames that give the above law with the form of exemptions in the beneficial legal persons. These frames form the incomes of all kinds of whatever source for the above reporting legal persons. For cohesion reasons, we underline that the exemption from taxes of the Hellenic State and the other legal persons belonging to the state, was established because in these fictitious persons there is coincidence of character, because these persons should be tax creditor and debtor.[14] Side

by side, according to case a', paragraph 1, of the above article 103, for whatever incomes that have the municipalities or the communities and other municipal foundations and beneficial civic companies, that service the municipal interests[15] exempt from tax.

4.1. Limitations in the taxation exemptions

The frame of exemptions according to the article 1, case 19 of Law 2459/1997, became limited in some points. In the first place, it must be explained that the municipal and the communal companies, which have a co–operation nature, have exemptions of first and second degree that is characterized as agricultural organization from the law. These exemptions fall into in the purposes in accordance with their articles. However, this exemption, except of taxes, does not include the revenues from real estate rents, dividend, bonds etc. This exemption does not include the profits from the sale of products which previously have been produced or converted.

However, the selection, the refinement, the cleaning, the pasteurization, the production of milk products and their simple wrapping for transportation and preservation of these agricultural goods, are not considered as an industrial elaboration. In addition, we note, that this exemption does not include profits from the retail sale of the agricultural products and goods generally to other persons that are not produced from the above co–operation or organization and their members.

In the above, we notice a frame about the limitation of exemptions in some forms of municipal and communal agricultural – beneficial companies which form the local self–government.[16] These companies, during the first five years of their operation, were exempt from the income tax (article 44, paragraph 2 of Greek Code of Revenue), but their exemptions were abolished. Also, we report, the abolition of exemptions for the other beneficial legal persons which had the privilege of exemption for the first two years of their operation.

5. Social purposes

However, before each approach in the more specific fiscal problems of

non–profit organizations, we will report the reasons that justify and impose the exemptions. So, according with the moving of the fiscal direction to the social[17] side we notice a certain a turn. In this social perspective, when we notice the contribution of the directions of the taxation, the tax exemptions and the privileges are supported from the national legislators, in order to assist the social forwarding of the non–profit fictitious persons.[18]

Anyway, the current situation that governs the forwarding of non–profit fictitious person, comparatively, does not verify the existence of the high privileges and the establishment of favorable taxation treatment for beneficial legal persons, as all these had operative in the past. So, on this subject of examination, we must control the extensive of the limits, marking the several forms and manners or remarks, which direct to us the formation in those meanings.

Besides, the typology in the equalization of several social connections, that form into meanings of the "profit purpose", show the several purposes of the social orientation of the foundations and institutions. Certainly, there is a reasonable doubt for the fulfillment of these social missions, because there are interpositions from the states, which cut down and subside the privileges and the tax exempts which characterize the beneficial legal persons.

Therefore, having as starting–point the form of the "society of the needs" and on the other hand the disposition to squeeze on the belongings privileges, cuts down several taxes exemptions for public revenue reasons. So, we proceed in the pursuit of the many fragile points that there are in the missions and activities of the non–profit fictitious persons[19].

If we emphasize in the constitutional rules on the tax principles and fiscal regulations, we will remark that these constitutional manifestations of the legality and certainty of the tax offer us the basis of exemptions. These legal structures consolidate constitutional and according with this, we remark the result from the constitutional rules which shows, exceptions, exemptions, deductions, etc. A special approach in the Greek Constitution, gives us a first picture of these topics, particularly in the articles 5 par. 4, 16 etc., where a person has the right in the protection of health, science etc.

Despite the above and the several explanatory releases on these subjects, that have been given from the government, a large number of fictitious persons with beneficial missions, it is compressed under the interposition

of government that aims at the limitation of privileges. Referring to the above remarks, the question is what meaning has the existence of non–profit character of one fictitious person, without the possibilities for the realization of directions and purposes. The fictitious person, as aforementioned, keeps the non–profit character even from this activity to obtain incomes or surpluses, provided these are used for those purposes. From the existing recognition of the purpose of "non–profit organizations", into the frame of social activities provides the model of ideology which is connected with the general traditional social purposes and the structure of the social policy.[20]

It is known from the side of taxation, that the native fictitious persons (public or private law) are subjected to tax for their clear income that results only for the income that comes from lease of real estate or dividends of shares or bonds etc., according to the special rules of Greek Code of the Revenue (Law 2238/1994), article 99 par. 1 case e´.[21]

To clarify that several economic reinforcement, are not subject to taxation, which are offered to civic beneficial companies, because these can not be put in the gross income of the above civic companies. These economic reinforcements are deposited of in a special account of the Deposit and Loans Fund, but are not subjected to deduction tax (20%) according to the special terms of the law. These incomes and every kind of revenues of beneficial fictitious persons that realize for the fulfillment of their purpose are not subjected to taxation.

6. Approaching the reality

In light of the above, we remark that, according to article 55 of Greek Code of the Revenue (law 2238/1994), the income from commercial companies becomes deduction of tax with analogous rate. However, the question is if the above concerns each company in the extensive meaning of the term. In fact there are exceptions from the term "company", because the purpose of the civic non–profit company is differentiated. This explanation is necessary, because in the article 55, par. 1, case e', the above law reports for public benefit foundations, organizations and companies of social utility services and generally unions of persons or associations

irrespective of their activities etc.[22]

According to the above remarks, it must be clear that these companies, in the extensive meaning of the term, could be kept for tax by the payment of fees to other persons, which is calculated with a rate of 20% in the gross amount. The above mentioned, prove that the economical reinforcements and payments, which are realisafed in a civic beneficial company from supports and allowances, the Taxation does not enlist them into the tax.

Consequently, the objective of tax in the beneficial legal persons is the clear income which concerns in Greece or abroad from the above mentioned ways. We repeat that if in a civic beneficial company exist any "surplus" during the managerial period, it cannot be received as income.

7. Consequences, correlation and interpretations

The problem that appears is when a beneficial legal person loses its character as non–profit, and is considered commercial, according to article 103 of Greek Code of the Revenue, is devoid of exemptions, as provided by the law. This point demands objective observation and it is investigated case by case maybe, because if a non–profit fictitious person makes a profit on practice of commercial or agricultural company, this profit is subjected to taxation because of change of purpose.[23]

These assumptions help us to differentiate the forms of beneficial actions by view of their separation among private foundations or other beneficial associations and legal persons. It is clear that the results of the characterization a foundation as benefit must be separated from the elements that are immanent in the other fictitious persons belonging to the State, which aim at public benefit purposes.[24] In the private public benefit foundations, the beneficial must be composed character first priority and not symptomatic. This benefit does not refute or change from the presentation of some profit with the form of surpluses that result, since the exchange – price covers the expenses for the services offered and overcome for the providing services.

A management auditing[25] of an association is not an easy supposition, since this association activates multiple, because there appear economical elements in multiple and expanding levels. The quest of the incomes and

expenses by category is resumed from the data of the Accounting Books according to the source of origin.

However, it is not excluded that there are deposits from the donators in Euro or in exchange or to belong to worldwide income. If it is exchange the value must le changed in Euro according to the initial date of payment. A foundation into its total income, it is possible to include income from real estate rents. In the total of incomes must be accumulated and the value of rents. The study of the elements in the area of the incomes that come from interest, always in connection with the keeping of deposit money and the sources of coming of interest show the great degree of accounting control.[26]

A non–profit fictitious person, cultural foundation, association etc., can receive allowances from the European Union where could be control in each account of the rest that come from savings. In the point of research of interest special attention must be paid, because it is possible to find allowances from Communal supports of the E.U. to the foundation, possibly to be placed in the program of European investments.

Above, we mentioned, generally, the control's income case without this to mean, that it will depreciate the meaning of the expenses and all the running costs of any non–profit fictitious person. This general description is a hypothesis any was given as a base for conceptualization of several levels of the incomes and expenses.

The associations as union of persons, irrespective of the foundations, have as an aim the promotion of the economical advantages of the members. In the following years, the sense of purpose differentiates, because this purpose must be continuous and non–profit and to concern the support of members, the education, the protection of the section of social life etc. According with the above determinative terms of the association meanings, it is clear that these unions in contradiction with the rest of other unions and particularly with the commercial unions (e.g. companies etc.) show that pursue any other lawful purpose besides profit.

The sense of the professional associations[27] is formulated into these semantic acceptances and directions. These associations have the exclusive purpose the study, the protection and the promotion of the finance or professional advantages of their members. In the association provide at first either the element of the personal co–operation or the subscription for

collecting money from the members. Besides, the typology of an association as non–profit fictitious person that had characterized according to the article 1 of law 281/1914, becomes subject of constitutional adjustment, with result the non recognition of an association with orientation the profit.

Passing over the above, we will look for actions of management from the dynamic of the association,[28] given that this organized community of persons, has its own legal personality which combines finance elements, incomes of partners, cash or possibly assessment of the income elements from real estates that belong in an association. So, in an association it is possible to have surpluses from donations or incomes or allowances from charities.

These objects have particularities because an association can receive money from different sources (e.g. donations or interest from participles or rents from other properties etc.). Besides of these, an association can get different supports, from the Ministry of Culture or from other foundations or other associations or legacies. Consequently, the aim of this approach is to show that the purpose of an association can always be economic[29] but not speculative. This means that the using bases for the success of the purpose do not have any influence on the characterization of any association as speculation.

8. Characterization of the economic purpose and its distinctions from the profit

The preceding parts have focused upon the analysis of the non–profit purpose. So, we determine the profit as an acquisition of a material advantage or as an advantage without compensation. Semantic, this means that the profit is looked for from the dominating practices of the term, analogous with the theoretical construction of aiming and researching. So we conclude that this income is founded as a substantive income and that is the result from the dynamic character of economy of a beneficial legal person. Consequently, the examination of this basic term achieves under the consistent meaning of dynamic, which is operational with the term "benefit".

Nobody can doubt that the taxation is pressing in its base and many times it tends to disfigure the institutions and appears under the form of only collecting money without social orientation. Unquestionably, there are cases where the interpretation of the Courts with the jurisprudence in its case differentiates the intention of the legislators.

Regarding the civics of non–profit companies it has been accepted from the theory and the case–law that as non–profit action is considered the practice e.g. of charity, the supply of scholarships and economic or medical aid to the poor but the practice in the economic management and the managerial responsibilities do not change the non–profit nature. Some selected examples from the area of health[30] in Greece will show the orientation of non–profit fictitious persons. We focus on the "Maternity home M. Iliadi" which is a public benefit association, the "Pammakaristos Hospital" the «Eye–Clinic of Athens" which is a public benefit association, the "Hospital AHEPA of Thessalonika", the "Evaggelismos" etc.

The above mentioned do not conclude the theme, because of the variety of cases of the fictitious persons and their actions we notice that pursue beneficial purposes. In addition, we must not forget the religious fictitious persons[31], the religious associations and the other non–profit characterize fictitious persons that pursue public benefit and philanthropic purposes. These fictitious persons give protection and help accordingly with the purposes that scope e.g. the hospital foundations, cultural foundations etc.

The non–profit legal persons are projected with activities, which get away from the speculation. The speculation as a term covers the form of the commercial fictitious persons. Actually, into the pursuits of the purposes fictitious persons, we isolated the non–profit and public benefit purposes and we notified that the pursuit of the non–profit purpose differentiates them from the base of orientation of other legal persons of profit organizations. Therefore, the pursuit non–profit purpose from the side of joining persons (associations, foundations, non–profit public companies, religious organizations etc.), the tax laws must give more privileges and not be compressed.

Besides, the purpose of this article is to provide a general approach to the revenues and surpluses of the beneficial legal persons from the side of taxation, because the equity of a tax depends on the outcomes of the relationship between a tax base and a tax rate. The revenue of the above

legal persons can be classified in terms of whether it is a donation, real estate rents, dividend, bonds, a fee a license, a debt service, a user charge and other miscellaneous revenues.

Consequently, a characteristic of a beneficial legal person development plan is that it is intended negatively to influence by taxes or by overtaxation and the result from the side of social planning remains uncertain or limited.

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(Titles from the Greek language translated by the author)

MARINAS AS POLES FOR SUSTAINABLE LOCAL TOURIST DEVELOPMENT: THE CASE OF GREECE

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Abstract

In this study we investigate the development of marine tourism and especially yacht ports (marinas) within the natural, social and cultural environment. We try to deal with the above matter within the frame of sustainable development where the natural, the social as well as the cultural environment are considered as an entity. In this way each procedure leading to development becomes part of the local area and adjusts to its needs, potential and particular growth prospects.

Marine tourism constitutes an alternative source of wealth for a country and that differentiates the product of the tourist industry. It concerns a wide range of activities including cruises and yachts. The aim of this paper is to examine the parameters and conditions that would enforce the development of the marinas, with a special interest for the natural and the cultural environment of each area. Specifically, we examine the port's direct connection with the local social environment, its limits, its potential as well as its prospects for sustainable development.

JEL classification: Q01, L83.
Keywords: Sustainable Development, local area, marinas, Greece.

1. Introduction

In the Mediterranean countries and especially in Greece the extended coastal areas constitute a natural resource of particular environmental significance from an ecological, social as well as cultural and economic point of view. Tourism, in its conventional form escorted by all the known environmental consequences, is a fundamental economic activity for these countries and that makes development a crucial matter. Although being

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beneficial, tourism goes with certain drawbacks such as the degradation of the coastal, marine and submarine natural environment and ecosystems due to all kinds of pollution, the destruction of the quality of tourist areas due to the urbanization which takes place without the provision of basic infrastructure to cover functional needs as well as the loss of the cultural face of the tourist areas[1,2].

On the other hand as mentioned before, tourism is a vital economic activity, an important social process and a significant employment sector. This discrepancy has led to the quest for ways, methods and strategies to deal with it and as a result of relevant research and several studies came the proposal for a political management of the coast[3,4].

Marine tourism is a vital economic activity in the Mediterranean, as many countries are involved in the related services. Marine tourism deals with two main activities, cruises and yachting. This paper deals with the yachting activity because it represents the demand served by the marinas. Cruisers are served by the passenger terminals in ports. The interacting system of yachting and marinas follows a traditional model where the marina provides services to its users, meaning the yachting companies or individual users. This paper introduces a new model where emphasis is given on the sustainable operation and development of marinas and yachting[5,6].

In these days what is sustainable development? - Development that meets the needs of the present without ensuring the ability of future generations to meet their own needs? -Living off the interest of our environmental and resource capital rather than spending the capital itself? - Thinking globally, acting locally? Doing more with less?[7,8,9] The phrase "sustainable development" has become an essential part of the vocabulary in terms of environment and development. The term is really a combination of two separate concepts "Development" and "Sustainability".[10,11]

"Development" is usually understood as a process that moves towards people's participation in the meeting of their own basic human needs such as food, health care, employment and housing and all these measured in GDP.

"Sustainability" as the word suggests means that the development process is one that can be conducted and retained in the long run. This means it must be economically, socially, and politically sustainable[12], it also means

that it must be environmentally sustainable. Thus sustainable development is an interacting system.

The new approach to development combines key development principles (factors that are necessary to ensure long–term economic, political or social viability–such as appropriate technology and community participation) with factors necessary to ensure environmental viability.[13]

This paper suggests a model of development for marinas that will involve sustainability emphasizing in people's participation to solve their own problems and become less dependent on external aid and more capable of using and developing their own resources as well as participating in the decision process (social aspect).[14] In this way the respect for traditional culture and lifestyle is enhanced (environmental aspect) and power and resources are shared (economic aspect).

Within this framework we examine the case of Greece where this activity is developing and we suggest the new approach to sustainable development.

2. The existing development model in Greece

2.1. Marine tourism in Greece

It is worth noticing that a growing competition has developed recently among the Mediterranean countries as far as the marine tourism sector is concerned. The countries of the Western Mediterranean constitute one pole of attraction and the countries of the Eastern Mediterranean another. In this way, the Mediterranean is divided in two basic areas for yachting. The sailing area of the Western Mediterranean includes mostly France (Blue Coast), Spain and Italy. The main characteristics of this area are the low temperature of the seas, the long distances among sailing stations, the absence of potential for development of new marinas, the high level of services offered at the existing marinas and the high prices.[15]

The sailing area of the Eastern Mediterranean includes primarily, Greece, Croatia, Turkey and Cyprus. The basic features of this area are the high quality level of the environment, the ideal temperature of the seas, the high archaeological culture and tourist interest, the traditional lifestyle, the inhabitants' hospitality and their way of life, the short distances among the

sailing stations, the great potential for new marinas, the low level of prices in relation to the marinas of the Western Mediterranean and the low level of the currently offered services.

Within this framework, Greece is an ideal place for the development of marine tourism with mild climate, ideal topography, long seashore and natural ports, more than 4000 large and small islands and the unique archeological monuments.

The development of ship tourism and especially the rental of yachts started in the middle of 1960s and is even more intensive during the last few years.[16] In 1978 there were 790 yachts (motorized or sailing vessels longer than 6 meters) in the country while in 1990 there were more than 2800. Today the Greek fleet of Yachts counts more than 5000 working crafts (70% of them are sailing vessels and 30% motor-driven) available for chartering. Moreover a large number of passing by yachts calls in Greek ports. In the year 2000 the yachts that called in Greek ports accounted to 41.233 with total capacity of 1.312.872. Approximately half of them sail only during the summer presenting a great deal of seasonality in the demand for marinas' facilities (Figure 1).

Figure 1: *Yachts sailing in Greece for the year 2002.*
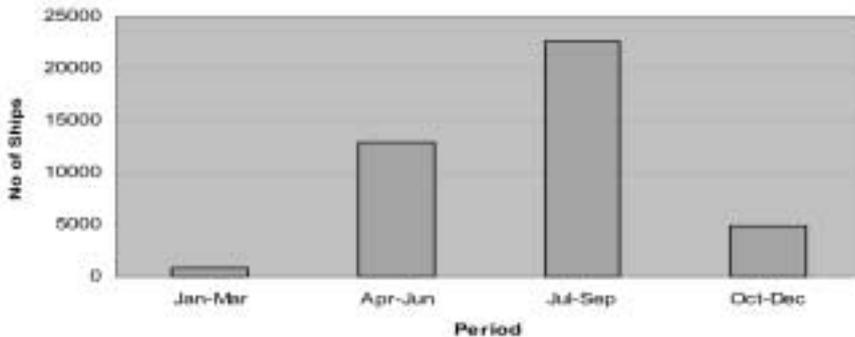
Source: Greek Ministry of Mercantile Marine: Department of Statistics.

In Greece, special legislation defines precisely the vessels that can be characterized as recreational or "tourist". As a "tourist ship or small craft" is defined every ship with autonomous propulsion in the sea, with or without dwelling chambers and cabins for up to 25 passengers-besides the cabins that are necessary for the crew- which by construction can be used

exclusively for recreation and tours with the payment of fare or not".[17],[18]

The actual size of the yachts determines to a great extent the marinas' infrastructure.

2.2. Marinas in Greece

2.2.1. Legislation about marinas

Marinas in Greece develop in two phases according to the Greek legislation. In the first phase (1960–1993) the marinas are developed near big town centres and are operated by public entities. These marinas have developed according to the traditional model and can be characterized as first generation marinas. Today these marinas show undersupply, high prices, low quality of service and inefficiency. In the second phase (1993–today) the attempt focuses to marinas' decentralisation with the regional and especially insular development being stressed. However even the second phase of the marinas' development seems hard to differentiate from the traditional model of development since in most cases the marinas show the traditional characteristics with the only exception of the participation of the private sector in the finance and the operation of the marinas.

Marina as defined by the Greek law 2160/93 is the land and sea space that is used mainly for the service of yachts either for anchorage or for long or short land deposition of the yacht or for whatever service the calling yachts need. In every tourist port (marina) according to this law, a part of land and sea is defined where it is allowed to carry out port projects and whatever kind of land activity that is necessary for the formation, the operation, the utilization, the exploitation and in general the financial viability of a marina. The land and the sea zone together constitute the zone of the marina.

Until 1993, that the above law was released, the construction of marinas by private capital and the concession to them for the exclusive exploitation and use of seashore were prohibited. The construction of port infrastructure was permitted only to the State, the Port Funds[19] and the Greek National Tourism Organization (GNTO)[20] and to the local community authorities and only after a general permission was granted by the Ministry for the Interior, Public Administration and Decentralization, the Ministry of Mercantile Marine and the Ministry for the Environment, Physical Planning and Public Works.

After the legislation of law 2160/93, the fundamental pertinences for all tourist marinas were assigned to the Ministry of Development and they have taken shape through a Ministerial Committee and the Secretariat for Supporting Tourist Ports (SSTP)[21]. According to the above law any, legal or natural entity, acting under a public or private right, physical owner or user of a property that one is interested to turn into a marina can apply to the Secretariat for Supporting Tourist Ports. Under the same law the possibility of the exploitation for the marinas that belong to the GNTO is granted to independent entities of public or private interest. The advantages of this law are that the institutional functional frame is modified, the bureaucracy is reduced and mainly the private sector has the opportunity to offer port services to yachts.

In many cases the users of marinas (large companies renting yachts) tend to become producers of port services by cooperating and forming trusts that challenge the exploitation of marinas. Today the municipal authorities, the local port funds, private entities and the Greek Tourist Properties (GTP) S.A.[22] (the majority of the shares belonging to the state mainly to the GNTO) are eligible for the management of a marina (Figure 2).

Figure 2: *Management Institutions in Greece.*
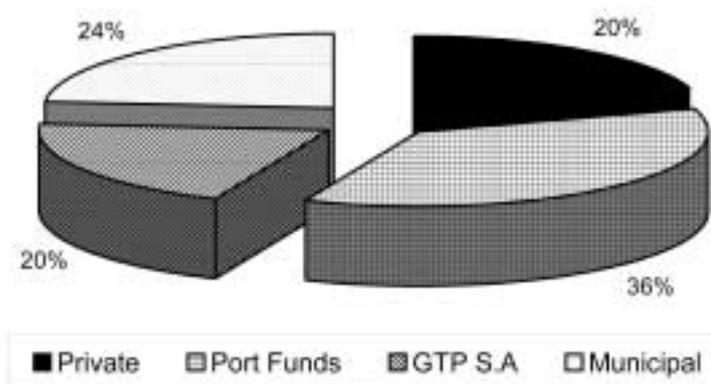
Source: Greek National Tourism Organization.

The establishment, the expansion and the modernization of marinas are considered to be tourist business activities that come under investments incentive law 2601/98. For this investment there are subsidies granted in all areas with a percentage subsidy 35%, interest subsidy 35%, leasing subsidy for the purchase of mechanical and other equipment 35% or alternatively in all

areas tax-exemption 70%, and interest subsidy 35%. These figures are indicative of the attention given to the development of marinas in Greece by the state, mainly because of the fact that they play a vital role in the development process especially of the periphery. This role is further enhanced by the attraction of services and business related to the services offered by the marina. In other words the marina can become a pole of attraction for a cluster of businesses related to tourism, leisure and culture as well as all businesses supporting the cluster (repair services, bunkering, commercial services etc).[23]

2.2.2. The services provided by the marinas

The services provided by the marinas in the existing model as they were included in the special publication of GNTO titled "Travelling in the Greek Sea" in the existent mode are the following:

1. Port Police
2. Security Systems
3. Customs
4. Medical-Pharmacy
5. Gardage Disposal
6. Health Places
7. Bank Services
8. Parking Places
9. Warehouses
10. Hibernate Services
11. Repair Services
12. Cranes
13. Slides
14. First Aid Services
15. Electric Power
16. Bunkering
17. Tele/Com

The services provided by the marinas that operate in the existent model have been evaluated by the users of the marina. Some indicative figures of such an evaluation are presented from a former research[24]. However, the aforementioned services appear to be non – existent even in the marinas of Attiki that are the most organized in the country. A research conducted showed that basic facilities that should be offered by modern marinas are characterized as non-existing from the 100% of those who answered the questionnaires; these facilities are the Medical-Pharmacy and the Bank Services. The 91% considers Warehouse and Repair services inadequate. Moreover the existence of Cranes and Slides is also considered poor by the 70-80% of the users. Insufficient are considered by the 50-60% of the

sample the telecommunications, the garbage disposal, the parking places and the health services. 45% of the users questioned consider the bunkering services satisfying and 18% very good. Only these last two services are regarded excellent by the 5%. In general we will conclude that the users are not happy with the quality of services provided at marinas in Attiki.[25]

2.2.3. The Infrastructure

The construction of marinas in Greece begun in 1960 with an initiative of the Greek National Tourism Organization.[26] Until 1993, 12 ports operated with 4.750 berths capacity and the contractor was almost exclusively the state (mainly GNTO) while their distribution was limited near the big town centers and especially in Attiki. The first generation of marinas was developed based on the traditional model of development, aiming to supply anchorage services. For these marinas the quality of service as well as effectiveness and efficiency were unknown words.

Today 20 marinas operate with up to 6.285 available berths. The marinas under construction are now 38 with 4.242 available berths. Another 30 marinas have been planned for construction and their capacity is expected to reach 6.385 berths (figure 3). Therefore, in the immediate future we will have overall 83 marinas with 16.912 berths. Out of the 83 planned ports, 54 are marinas, 25 provide harbourage[27] and 4 are small hotel ports[28,29] (Figure 4). The financing of the investment in such ports takes place from the Regional Entrepreneurial Programs (55%), the Second European Support Framework (26%) and other organizations (19%).

Figure 3: *Berths for yachts in Greece.*
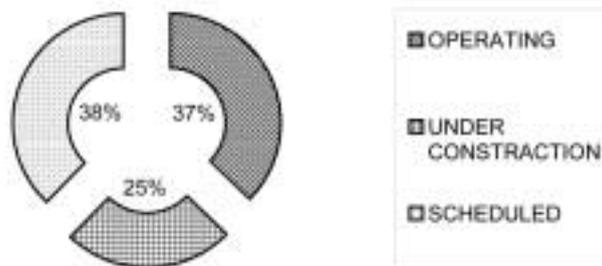
*Source: Greek National Tourism Organization.*

Figure 4: Planned Berths by category.
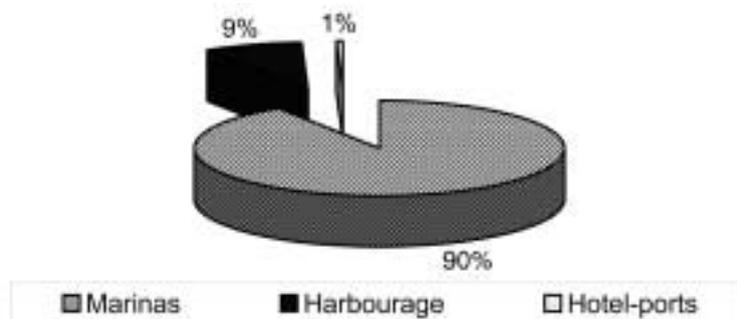
Source: Greek National Tourism Organization.

The 20 operating marinas are distributed in Greece as shown in figure 6. Most of them are located in urban regions and especially the region of Attiκι (figure 5).

Figure 5: *Berths by Area.*
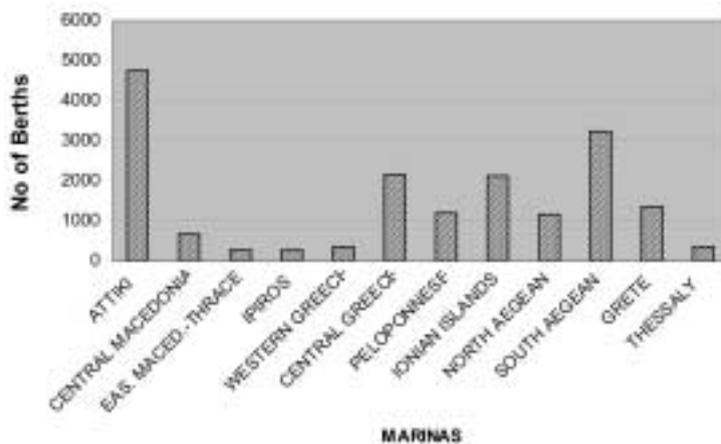
Source: Greek National Tourism Organization.

With the analysis above is clear that in the existing model the most operating marinas are gathered in Attiki (Map 1). Attiki has been a pole for development of such facilities in the recent years. However, as seen in map 1, after the modernization effort that begun in 1993, decentralization is eminent. The marinas under construction as well as the planned ones present a high

distribution especially in the insular areas with social and cultural differentiation and distinction.

Map 1: *Marinas in Greece.*

The fact that the development of marinas is a process in advance should be taken into consideration, while emphasis should be given in the sustainable development not only of the marinas but also of the local area it operates in.

3. Marinas as Local Poles for Sustainable Development[30]

As noted, in the abovementioned analysis, there has been an effort lately to develop additional marinas in Greece. New marinas are constructed and the already existing are extended and synchronized. This model of development though does not take into consideration the particularities of each area. The marinas are not organized in a sequent and interdependent way with the local community and the largest marinas are close to the big city centers. Recently we have noticed a tendency to decentralization but without the proper organization and sometimes with parameters that do not promote the development of the area but on the contrary pose an obstacle to its further development. At the same time productive resources are wasted since it is well known that the investment in port facilities does not always constitute a means of development especially if other prerequisites are not met.

The purpose is to examine the parameters that can render marinas as a mean of sustainable development at local areas, which the authors consider as a complex adaptive system. One can characterize the development of marinas as an alternative form of tourist development, provided that their construction and operation is a part of the local community, its needs, its possibilities and its special developmental perspectives.[31] In particular the term **"local area"**, is the place surrounding the area as well as the socio-economic and cultural environment.[32,33,34] A basic condition is the preservation and promotion of the environment in its whole as well as the recognition of its particular characteristics. We note at this point that every local community, with the immediate participation of its members, is capable to support and promote its special characteristics, hold an opinion about the quality of life and the welfare of its members along with its development. In this manner the autonomous local growth takes advantage of the local resources, it is managing its finances without though leading to autarchy and regionalism.

The location of Greece in the Mediterranean as well as its natural beauty and its historical heritage gave it the advantage to develop marine tourism. However the prerequisite to achieve this development in a continually competitive environment, can not only be based on natural beauty but a sufficient ground is also needed so as to secure low costs with high quality

services that can also protect the environment and respect the cultural heritage.

With the selection of sustainable tourist activity, the sophisticated and complicated local area is prepared to accept and welcome the entity of the marina by offering not only port services but also the **special character of the local community** that one can call it as a special local "tourist product".

Furthermore, analysis concerning the residential area: the settlement, the accommodation and small hotel units should fit to the natural environment and match with the architecture and aesthetics of the local area.

Elements relative to the cultural environment: the cultural heritage - the archeological places, the museums, the archeological and folklore parks, the historical and archeological tours, should be preserved and promoted.

The socioeconomic environment: the production ways should be organized as traditional cultivations, stockbreeding, fishing, small industries that manufacture local products, revitalization and support of traditional professions.

Last but not least there is the cultural environment. Attention should be given to the local way of life, the traditional cooking and the way of recreation, the artistic activities and displays with local traditional costumes.

Taking thus into consideration the above points:

The construction and exploitation of marinas should come under the jurisdictions of local communities[35]. Specifically, townships and communities should be responsible and through the boroughs other private shelters should come along and participate.

For the construction and expansion of marinas it is suggested that such necessity should be examined. Further, the accessibility of the marina to the certain area should be examined. As soon as the need is defined the marina should be spatially planned and functionally programmed in order to ensure that in every special case we have that **"type of port"** that will be in harmony with the natural and cultural environment of the area.

More precisely the construction works should respect the natural environment (the land as well as the sea), the aesthetics and the cultural character of the area.

Based on this perception the policy of spatial planning for port infrastructure and sea tourism should be grounded on the following principles:

- Respect for the natural environment and the promotion of the aesthetics of the surrounding area.
- Respect for the cultural and historical heritage of the place as well as respect for the architecture of the community in which the marina is constructed.
- The preservation and protection of space and plottages.
- Port development should be limited when it reaches points of social and texture saturation.
- The formation of plans and the creation of a scheduled framework before the construction of a marina. In particular a more thorough environmental research should be conducted.

However, building the facility on a sustainable basis is not always enough. Sustainability should not become an obstacle in the economic development of the area. The economic development should grow along with sustainable development. Thus the marina as a business unit should be in interaction with the local community.[36] The marinas viability should be evaluated along with the regional viability. Such a business is viable within the introduced framework when apart from its main operations, involves itself in a broader cluster of operations related to the direct services. Thus the services that could be involved in the new economic environment of the tourist area can be categorized in:

- *Port services:* like mooring and anchorage, fully marking, protection from weather conditions, towage services, stowage places, parking facilities, convenient inland access, space available for repair and winter deposition, security systems etc.
- *Indirect services:* water supply, bunkering, electric power supply, modern telecommunication systems, garbage collection and slop removal.
- *Administration Services*, administrative port office, customs, port authority etc.
- *Newbuilding and Repairing Services:* building, repair and maintenance units for the yachts, technical support for electronic equipment, market available for supply of marine materials etc.
- *Tourist and other services:* restaurants and recreation places,

information centers, banking services, sanitary services, commercial services, pharmacies and health centers etc.

The abovementioned services can be provided by the port utility or by other private or public providers.

In regard to the services offered, their quality should be a primary concern. Within this frame of reference the necessity of qualitative Management techniques, the training[37] of employees into new technologies and above all the adoption of a **"holistic-ecological"** consciousness and attitude are proposed.[38] The services should be offered in a manner that respects the environment. For example the water system could be based on recycling water. The supply of electric power could be provided through mild forms of energy. The management of residuals and the recycling should be standardized, etc.

4. Conclusions –Suggestions

Conclusively, perceiving a marina in a holistic approach the visitor and – at the same time–the user of the marina can enjoy the local area's particularities, its culture, its traditions and way of life.

The construction and development of a marina in an area can bring not only financial advantages to the company that is the contractor of the port services but the local community can benefit as well. The socioeconomic impact of a marina is substantial since the dynamic development of the marina interacts with the local community. The new working places that arise contribute significantly to the reduction of unemployment. Moreover, the income of certain social–professional categories is enforced, affecting the total economic development of the local community. Eventually, the resources are not saturated if this model of development is followed and some remain to be exploited by the forthcoming generations.

In this sense, the modern marinas of the suggested third generation should not follow the traditional model of service i.e. services for yachts, but should instead become a link between the port product and the tourist product along with the local production specialization. This presupposes an institutional change, the participation of the local conveyors in the decision process as well as the adoption of modern technology. The aim should be

the development of local networks that would eventually operate as a marine tourism cluster.

Thus a marina can contribute in the local, and not alone, development as a leader firm, able to impel the promotion of the marine tourism cluster product internationally from one hand and from the other hand its competitiveness nationally and globally.

NOTES

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15. Greek National Tourism Organisation.

16. Roussopoulos, P., (1995), The Demand for Marinas in Greece, Institute of Economic and Industry Research.

17. Yachts in regard with the port services in demand can be classified as following:
Yachts with length 6–7 meters. (Those are mostly private vessels that need basic services of anchorage and are withdrawn from sea in winter).
Yachts with length 7–15 meters. (They are yachts of a variety of types, with high cost of maintenance and high demand for port services; rarely any of them is withdrawn from water).
Yachts beyond 15 meters. (Those are mainly motor-driven sailboats. To sail them you need a Captain and in some cases additional crew. The anchorage of such yachts requires ports with high service facilities and repair services).
Ships that have cabins are called tourist yachts and those that do not are characterized as tourist crafts. Ships are characterized for private use if there is no payment of hire otherwise they are characterized as professional ones.

18. Euthimiatou, A. Touristiko Dikaio, Sakoullas Publications, Athens,

1997, p. 267.

19. Local public bodies under the supervision of the Greek Ministry of Mercantile Marine that operate as a public Port Authority.

20. The Greek National Tourism Organisation (GNTO) is a Public Entity (PE) supervised by the Greek Ministry of Tourism.

21. Secreteriat established by the Greek Ministry of Economy and Finance (law 1260/93) in 1993, subject to the Greek Ministry of Development. Its duty is to support the Tourist Ports Committee and the promotion of the reports and studies of the related Institutions. Generally the management, the exploitation and the control are conducted by the Ministry of Development.

22. A public owned corporate company that manages the public tourist property.

23. It's worth noticing that there are 62 stations in operation for supplying bunkers and drinking water. Moreover, one can find in Greek Ports 121 shipyards for maintenance and repair and 109 workshops for engine and deck repairs. The majority of shipyards are located in the area of Perama (27), at Corfu, Volos and Spetses (8), the port of Chalikida (7), etc. The most repair units and shipyards are at the ports of Perama (45), Patras and Volos.

24. Pardali, A., (2000), *Demand and Supply of Yacht Services: The Greek Case*, Essays in honour of Professor Marios Raphael,Piraeus: University of Piraeus.

25. Pardali, A., (2000), *Demand and Supply of Port Services for Pleasure Boats: the Greek Case*, Scientific Collected Papers in Honor of Prof. M. Raphael, Piraeus.

26. MarinaVouliagmenis 1965, Marina Zeas 1970.

27. The law 2160/93 also prefigures the construction of berthing places and anchorages for yachts in protected moorages with limited or basic service facilities. The planned harbourage for yachts are overall 25 and the total berths are expected to overcome 1400. It's worth noticing that except for the ports we mentioned, there are 62 stations in operation for supplying bunkers and drinking water. Moreover, one can find in Greek Ports 121 shipyards for maintenance and repair and

109 workshops for engine and deck repairs. The majority of shipyards are located in the area of Perama (27), at Corfu, Volos and Spetses (8), the port of Chalikida (7), etc. The most repair units and shipyards are at the ports of Perama (45), Patras and Volos.

28. The law 2601/98 permits the operation of marinas by lux hotels. Within this frame today operate four hotel ports with total capacity of 90 berths.
    - Nausa Paros, capacity 21 (investor Porto Paros).
    - Kardamena Ko, capacity 26 (investor Porto Bello).
    - Lianos Kavos Rethimno, capacity 17 (investor META A.E.).
    - Elounda Lasithi, capacity 26 (investor Elounda Mare).

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31. Hamzah, B.A., (2005), *Ports and Sustainable Development: Initial Thoughts*, United Nations Institute for Training and Reasearch (UNITAR), Hiroshima Office for Asia and the Pacific.

32. Biro, A., (1992), The Local Place, Athens: Society and Nature.

33. Chodorkoff, D., Community and Development, Institute for Social Ecology.

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IMPACT OF ARBITRAGE ON EUROPEAN FINANCIAL MARKET INTEGRATION

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Abstract

This paper examines the integration process for the difference between the prices of the siamese twin stocks of ABB/ASEA and Royal Dutch/Shell that cross-listed in Europe. A primary focus of this study is to examine the spillover effects (noise) for the difference between prices of the above siamese twin equities with the relevant foreign stock market indices on which these are traded. We investigate the relationship between spillover effects (noise) and arbitrage opportunities arising from daily stock price difference between the prices of twin equities that cross-listed in different European stock markets. The performance of the stock price difference of the examined siamese twin equities is compared with the relevant stock market indices to investigate the impact of price gap (arbitrage) on stock market integration. Overall, we find that arbitrage has a significant impact on spillovers (noise).

JEL classification: G15.
Keywords: Arbitrage, cross listings, integration, GARCH.

1. Introduction

This paper examines the process of information transmission for cross-listed equities that are traded in European markets. Specifically, we examine 'Siamese-twin' company stocks or pairs of corporations whose charter fixes

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the division of current and future equity cash flows to each twin. The twins each have their own stock, with its own distinct trading habitat. In this study, we examine two examples of Siamese twins: Royal Dutch Petroleum and Shell Transport and Trading PLC; and ABB AB and ASEA. Other studies, such as Froot and Dabora (1995, 1999) examined three examples of siamese twins: Royal Dutch Petroleum and Shell Transport and Trading PLC; Unilever N.V. and Unilever PLC; and SmithKline Beecham. They point out that Siamese-twin stocks provide a more clear-cut of 'excess comovement' for several reasons. First, the twins they examine are among the largest and most liquid stocks in the world. Second, Siamese-twin stocks represent claims on exactly the same underlying cash flows. Thirdly, the stocks of the twins can be arbitraged easily. In the current study, we investigate empirically the level of integration between the difference of the stock price return of the twin equities and the stock market index in which they are traded. If there are arbitrage opportunities between the two stocks, we expect to find a low level of integration with the respective stock exchange on which they are traded.

In addition, Siamese twin stocks traded on major world stock exchanges, and they can both be purchased locally by many investors. For example, a U.S. (Dutch) investor can buy Royal Dutch and Shell in New York (Amsterdam). As a consequence, the additional costs and informational advantages commonly associated with cross-border trading cannot be used in the analysis of Froot and Dabora (1999) to explain their results. With respect to the above, we believe that the price difference of the Siamese twins that are bought locally could affect the level of integration with the respective market differently locally than internationally.

One interesting question which should be answered with regards to Froot and Dabora findings is what sources of segmentation might explain these findings. One hypothesis is that of cross-border tax rules. Withholding taxes on dividends differ across countries and investor clienteles, however the withholding taxes for any given investor are the same for stocks of any pair of twins. Thus, while helpful, tax-driven stories cannot fully account for their findings.

A second possible source of segmentation is country-specific noise. Suppose that a noise shock hitting, say, U.S. stocks, disproportionately affects the twin which trades relatively more in New York. In other words,

stocks that trade more actively in the local market are more sensitive to local noise shocks and less sensitive to foreign noise shocks. This story has an interesting implication: the component of market movements explained by changes in twin's relative prices is likely to be noise. Twin price disparities, which are readily observable, may be informative about market-wide noise shocks, which are not directly observable.

Taking into account the above literature on 'Siamese twin' equities, the starting point in the current study is the extension of the above-mentioned research of Froot and Dabora (1995, 1999) to the European security market. In particular, instead of the Ordinary Least Squares (OLS) model that Froot and Dabora uses, we use the multivariate GARCH-BEKK model introduced by Engle and Kroner (1995) to control for systematic risk as in Bollerslev, Engle and Wooldridge (1988), Bodurtha and Mark (1991), and King, Sentana, and Wadhwani (1994). Hereafter we use the model known as the GARCH-BEKK-CAPM. In this respect, unanticipated returns are assumed to depend both on innovations in 'observable' noise and country-specific noise.

Overall, we find that the log price difference of the twin equities (Royal Dutch-Shell) and (ASEA-ABB) are correlated with the markets where they are listed and that explanatory variables such as local or global exchange rates can have an impact on the European integration process between 'arbitrage gap' and the respective stock indexes where a twin company is listed. The systematic beta effects found not to be important, as the covariane (1,2) / variance(1) found to be not statistically significant from the stock indexes back to the twin equity difference.

This paper is structured as follows. Section 2 provides a literature review with the main hypotheses that are tested. Section 3 outlines the research design and provides the siamese twin equity data, and Section 4 provides the empirical findings finally, the conclusions are summarised in Section 5.

2. Literature review

Previous studies on stock market integration concentrate on the level of integration between markets. A number of studies examine the transmission of news between markets for their market indexes. For

example, Bennett and Kelleher (1988), Von Furstenberg and Jeon (1989), Hamao, Masulis and Ng (1990), King and Wadhwani (1990), Schwert (1990), Susmel and Engle (1990), Neumark, Tinsley, and Tosini (1991), Becker, Finnerty, and Tucker (1992) demonstrate this type of transmission of news. In their various analyses, they report that the transmission of volatility between markets is also time-varying, that lagged spillovers of price changes and price volatility exist between major stock markets, and that, when volatility is high, price changes in major stock markets tend to become highly correlated.

There is some evidence that relates volatility spillovers to barriers on structural differences between markets for their stock market indexes. Specifically, Kanas (1998) shows that spillovers across markets with diverse structures are different to those with similar structures. While Kanas (1998) focuses on London, Paris, and Frankfurt, other studies (e.g. Hamao et al. (1990), Theodossiou and Lee (1993)) focus on the major stock markets (US, Canada, Japan, UK, and Germany). For example, Hamao et al. (1990), Koutmos and Booth (1995), and Susmel and Engle (1994) focus on spillovers across New York and London, and Theodossiou and Lee (1993) examine spillovers across US, Japan, Canada and Germany. In addition to the above, Hamao et al. (1990) find the existence of spillovers from the USA and UK markets to Japan. Koutmos and Booth (1995) find that the transmission of volatility is asymmetric and is more pronounced when news is bad and coming from either market. Other evidence from Susmel and Engle (1994) find that volatility transmission is short and small between New York and London, in contrast to Teodossiou and Lee (1993) who note that the US capital market is the major 'exporter' of volatility to other financial markets.

The research design of each of the above studies involves the use of GARCH models to examine transmission patterns. GARCH models with conditional correlation are developed extensively in the finance literature to model spillover effects. As research reveals, volatility spillovers from the US capital markets could lead the rest of the world (Eun and Shim, 1989) and also correlation between markets could increase over time (Koch and Koch, 1991; Von Furstenberg and Jeon, 1989). In particular, Eun and Shim (1989) study the change in daily stock returns across nine stock markets using a VAR approach adjusting for non-synchronous stock

price trading hours in different markets. As already mentioned, these authors found that the US market is by far the most influential vis-à-vis other markets. On the other hand, Von Furstenberg and Jeon (1989) investigate the relationships between change in daily stock price returns in Japan, Germany, the UK, and the USA markets over the period 1986 to 1988. They find an increase in the correlation between the above markets especially after the October crash in 1987. Studies that have used the GARCH modelling framework in the past, however, have typically not used specifications that control for the impact of arbitrage (such as different stock price returns between Siamese twin equities) on stock market integration, the main focus of the current study.

As Karolyi (1995) has pointed out, barrier restrictions have an impact on interdependencies and these need to be taken into account using GARCH models in order to be able to draw correct inferences on such spillover relationships. In addition, such interdependencies may be related to the ongoing debate on arbitrage, and further on the impact of siamese twin 'cross-listing' equities on the market integration which is the empirical question in this study. The debate on market interdependence and its relation to arbitrage opportunities is also of particular importance in Europe where there have been departures from the law of one price for two merged equities that traded on different stock exchanges and moves to market segmentation and therefore market independence.

In this respect, an analysis of volatility spillovers between siamese twin cross-listed equities with the stock market indexes where these are traded may help to inform us more about the market integration process which arise as a result of arbitrage opportunities from merged equities. Maldonado and Saunders (1983) study the British regulatory restriction[1] on foreign investment and find little evidence or no impact. Foreign investors are not restricted in their investments in U.S. securities that sold in London. Thus, although British investors are not restricted in their arbitrage opportunities, U.S. investors are. Thus one-way arbitrage appears to be sufficient to maintain stock price parity.

To investigate how exchange rates impact on covariances between equities, we adopt King et al.'s (1994) suggestion[2] and use the GARCH-BEKK modelling approach to investigate the impact of exchange rates on the magnitude and persistence of volatility spillovers for our siamese twin

cross-listed European equities. Studies that investigate the effects of exchange rate changes on volatility spillovers (e.g. Dumas and Solnik, 1995) find that the magnitude and persistence of spillovers are increased the higher the movement of the exchange rate changes. Previous studies (Dornbusch and Fischer, 1980; Cho, Eun, and Senbet, 1986; and Korajczyk and Viallet, 1989) also suggest a significant impact of exchange rates on stock price volatility.

In addition to the impact of exchange rate on stock price volatility, various studies have investigated a number of market anomalies (such as the size, the BE/ME, and the market beta) using a CAPM or APT modelling framework. For instance, Fama and French (1993) and Elton and Gruber (1997) extend the single factor model to a multi-factor model taking into account the arbitrage pricing theory by Ross (1976) identifying that common risk factors may explain stock price movements. Despite the extensive use of the CAPM framework for considering effects on the systematic risk of stocks, more recent studies use the CAPM-GARCH[3] model of Bollerslev, Engle, and Wooldridge, 1988; and Bodurtha and Mark, 1991.

This paper aims to address these issues by examining the influence that arbitrage opportunities and exchange rates have on volatility transmission of siamese twin cross-listed European equities. The following section 3 outlines the methodology adapted to investigate spillover effects for European siamese twin cross-listed companies. The analysis mostly aims to investigate volatility spillovers in a similar manner to the established literature and then to test to see how arbitrage such as price discrepancies of siamese twin equities influence such spillovers. Finally the paper examines how exchange rate changes impact on these spillover effects.

3. Data and Sample Characteristics

We use daily stock returns for two Siamese twin equities listed in foreign stock exchanges of European countries. Our data source is the Datastream International and the sample extends from January 1987 to December 2000. Table 1 provides our cross-listing sample description for the twin equities of ABB/ASEA and Royal Dutch/Shell. This table shows the

exchanges in which each of the Siamese twin equities is listed. More specifically, we observe that the Royal Dutch and Shell equities are commonly listed in the exchanges of Frankfurt, Brussels and Paris. This characteristic is a motivation to examine the spillover effects between these mentioned above stock exchanges and the price difference of (Royal Durtch – Shell). Because Royal Dutch only is additionally listed in the stock exchanges of Luxembourg and Zurich we investigate the spillovers between these exchanges and the price difference of the twin equity as mentioned above. We apply the same philosophy on the twin equities of ABB and ASEA and we examine the spillover effects between the exchanges where they are listed and the price difference of (ASEA–ABB).

Table 1: *Siamese Twins Stocks/Domestic and Foreign Interlistings for Stock Prices.*

	STO	FRANKF.	DEN	XSQ	XET	ZUR	AMS	LO	FRA	LU	BRU	AU
ABB	X		X	X(A+B)								
ASEA	X	X										
ROYAL DUTCH		X			X	X	X		X	X	X	
SHELL		X(ORD. + CE	RT.)					X	X		X	

Note: A means A shares, B means B shares, Ord. means ordinary shares, and Cert. means Certificates.

Table 2 provides descriptive statistics for the log price difference of the two twin equities the price indexes where they are listed and also some exchange rates such as the SEK TO SWISS (Swedish crone to Swiss franc), SEK TO U$ (Swedish Crone to US dollar), NLG TO GBP (Netherlands currency to Great Britain Pound), and NLG TO U$ (Netherlands currency to US dollar). In most of the series there is excess kurtosis and negative skewness and also there is a difference in the mean value of the log twin equity prices and the exchange rates. There is a similar characteristic in the value of standard error between the log price difference of the twin equities and the exchange rates.

Table 2: *Descriptive Statistics.*

	Mean	St. Error	T-Statistic	Skewness	Kurtosis
ASEAABB	0.00038	0.018	1.15	0.72	10.70
Copenhagen	0.00032	0.0096	1.56	−0.37	3.98
SEKTSWISS	0.000092	0.0059	0.57	0.40	2.068
SEKTU$	0.000034	0.0061	0.20	−0.12	1.26
Zurich	0.00051	0.010	2.65	−1.14	12.40
ROYLDS	0.00047	0.013	2.023	−0.060	3.099
Paris	0.00036	0.012	1.54	−0.33	5.15
German	0.00057	0.011	2.60	−1.18	13.99
Brussels	0.00041	0.0087	2.21	−0.13	5.46
NLGTGBP	−0.0000091	0.0047	−0.10	-0.80	7.98
NLGTU$	−0.000047	0.0071	−0.37	−0.049	2.96
Luxembourg	0.00075	0.0082	3.82	0.27	8.020

4. Methodology-Siamese twin cross-listed equities, and volatility spillovers

As noted already the main aim of this paper is to investigate both systematic and unsystematic spillovers relating to siamese-twin cross-listed companies in Europe. This requires us first to identify the relevant data sample, as outlined in the previous section, and then to model the interrelatedness of returns between the difference between the prices of the twin stocks and the stock market indices. In order to do the latter we follow Engle and Kroner (1995), but we modify their model to take into account systematic market beta effects as in Bollerslev, Engle, and Wooldridge (1988). Rather than examining spillovers between markets we narrow the focus by using Froot and Dabora (1999) specification[4] to examine the comovement between twins' log return difference and stock markets on which they are traded.

Froot and Dabora (1999) note that stock prices affected by the location of trade. They suggest that currency changes also affect the twins' log return difference. Specifically, stocks that are most intensively traded on a given market will co-move excessively with that market's return and currency.

As such, our analysis seeks to examine the magnitude and persistence of spillovers between the twins' return difference of cross-listed companies with the stock market indices in which they are traded. The main reason for examining spillover effects (systematic and unsystematic) between the twins' return difference and stock market indices is that we wish to investigate whether arbitrage (stock price discrepancies) change the direction in which information transfer between markets.

The broad methodological approach adapted takes the following steps:

STEP 1: We obtain data on European siamese twin cross-listed companies identifying the foreign location of trading for each siamese-twin equity (Table 1).

STEP 2: As in Froot and Dabora (1999) we examine spillovers between the stock markets in which the siamese twin equities are cross-listed and the difference between the prices of twin stocks. To do this, we use a GARCH-BEKK approach, similar to Engle and Kroner (1995) but we modify their model to take account of systematic risk effects, as in Bollerslev, Engle, and Wooldridge (1988). The modelling framework takes into account both systematic and unsystematic risk components. The aim is to see whether spillover effects between the stock markets and the difference between the prices of twin stocks influence capital market integration. The methodology also allows us to investigate the systematic spillover effect from the stock market index to the difference between the prices of the twin stocks.

STEP 3: Here, we use the GARCH-BEKK-CAPM modelling approach to investigate whether exchange rate changes influence the magnitude and persistence of spillovers. Kanas (2000) and Froot and Dabora (1999) have suggested that exchange rate changes have a significant influence on information transfer between markets and this will be investigated in our analysis.

4.1. The GARCH-BEKK-CAPM Model

Among GARCH models, multivariate GARCH approaches are the most widely used in time-varying (second moments) covariance studies. Such GARCH approaches include the Vector (VEC) of Bollerslev *et al.* (1988), the constant correlation (CCORR) of Bollerslev (1990), the factor ARCH (FARCH) of Engle *et al.* (1990) and the GARCH-BEKK of Engle and

Kroner (1995). The GARCH-BEKK model represents a successful attempt to overcome the various technical difficulties associated with previous approaches, such as the fact that the definite H_t matrix may not always be positive (a restriction imposed in the previous empirical approaches). Previous approaches impose the restriction for the estimated variance to be greater than zero when spillovers are examined. In contrast, the GARCH-BEKK parameterisation is specified in such a manner that no restrictions are required to ensure a positive definite H_t matrix.

Underlying these theoretical developments, the multivariate GARCH-BEKK [Berndt, Hall, Hall and Hausman (1974) and Engle and Kroner (1995)] model is written as follows:

$$r_t = \alpha + \sum_{p=1}^{n} \Phi_p r_{t-n} + e_t, \; e_t \mid \Omega_{t-1} \sim N(0, H_t) \tag{1a}$$

$$\text{or}$$

$$r_t = \alpha + \sum_{p=1}^{n} \Phi_p r_{t-n} + X_{t1}, X_{t2} + e_t, \; e_t \mid \Omega_{t-1} \sim N(0, H_t) \tag{1}$$

where,

r_t is the return series,

e_t is the error term of return equation,

α is the constant term in the above return equation,

X_1 and X_2 are the exogenous variables of the return equation,

Φ_p is the matrix of coefficients with the p lagged values of r_t

Ω_{t-1} is the matrix of conditional past information that includes the p lagged values of r_t.

To avoid the problems of dealing with normal distributions[5], the first moment of errors et is represented by a martingale process, as shown in Equation (2). It is assumed that et in Equation (1) follows a process of E (ε_t).

where,

$E(\varepsilon_t) = E(R_t - \beta_0 - \beta_1 {}^* \text{ (covariance (1,2)/variance (1,1)))},$ for the log price difference of the twin equity $\tag{2a}$

and

$$E(\varepsilon_t) = E(R_t - \mu_0) \text{ for the stock indexes} \tag{2b}$$

β_0 is the long-term drift constant coefficient

β_1 is the long-term drift coefficient of covariance of the two series / variance of the first series

μ_0 is the long term drift coefficient

and

$$H_{t+1} = CC' + B'H_tB + A'\varepsilon_t *\varepsilon_t' A \tag{3}$$

Given a sample of T observations of the returns vector, r_{t+1}, the parameters of the bivariate systems are estimated by computing the conditional log-likelihood function for each time period as:

$$L_t(\Theta) = -\log 2\pi - \frac{1}{2}\log|H_{t+1}| - \frac{1}{2}E(\varepsilon_t)'(\Theta)H_t^{-1}(\Theta)E(\varepsilon_t)(\Theta)$$

and
$$L(\Theta) = \sum_{t=1}^{T}L_t(\Theta) \tag{4}$$

where Θ is the vector of all parameters. Numerical maximization of the log-likelihood function following the Berndt, Hall, Hall, and Hausman (1974) algorithm yields the maximum likelihood estimates and associated asymptotic standard errors.

An expansion of the GARCH-BEKK parameterisation equation for the bivariate GARCH (p, q) model takes the form:

$$
\begin{pmatrix} h_{11,t+1} & \\ h_{12,t+1} & h_{12,t+1} \end{pmatrix} = \begin{pmatrix} c_{11} & c_{12} \\ c_{12} & c_{22} \end{pmatrix} * \begin{pmatrix} c_{11} & c_{12} \\ c_{12} & c_{22} \end{pmatrix} +
$$

$$
\begin{pmatrix} b_{11} & b_{21} \\ b_{12} & b_{22} \end{pmatrix} * \begin{pmatrix} h_{11,t+1} & \\ h_{12,t+1} & h_{22,t} \end{pmatrix} * \begin{pmatrix} b_{11} & b_{12} \\ b_{12} & b_{22} \end{pmatrix} +
$$

$$
\begin{pmatrix} \alpha_{11} & \alpha_{21} \\ \alpha_{12} & \alpha_{22} \end{pmatrix} * \begin{pmatrix} e_{1,t} \\ e_{2,t} \end{pmatrix} * \begin{pmatrix} e_{1,t} & e_{2,t} \end{pmatrix} * \begin{pmatrix} \alpha_{11} & \alpha_{12} \\ \alpha_{12} & \alpha_{22} \end{pmatrix} \tag{5}
$$

where h_{11},t + 1 is the volatility for the first series in period t + 1; $h_{22,t+1}$ is the variance of the return series in period t + 1; $h_{12,t+1}$ is the covariance between the first and the second series in period t + 1; c_{11} is the constant coefficient for the first series in period t; c_{12} is the constant coefficient for the covariance between the two series in period t, and c_{22} is the constant coefficient for the second series in period t; b_{11} is the volatility coefficient for the first series in period t; b_{21} is the volatility spillover coefficient from the first series to the second series in period t; b_{12} is the volatility spillover coefficient from the second series to the first series in period t; b_{22} is the volatility coefficient for the second series in period t; a11 is the coefficient of error term for the first series in period t; a_{21} is the coefficient of error transmission from the first series to the second series in period t; a_{12} is the

coefficient of error transmission from the second series to the first series in period t; a_{22} is the coefficient of error term for the second series in period t; $e_{1,t}$ is the error term for the first series in period t, and $e_{2,t}$ is the error term for the second series in period t.

Expanding the above equation to find the intercept terms, in particular the coefficients of lagged variance and covariance and the coefficients of lagged squared errors and lagged covariance of squared errors, this provides the following equation:

$$
\begin{pmatrix} h_{11,t+1} \\ h_{12,t+1} & h_{22,t+1} \end{pmatrix} = \begin{pmatrix} c_{11}^2 + c_{12}^2 \\ c_{11}c_{12} + c_{12}c_{22} & c_{22}^2 + c_{12}^2 \end{pmatrix} +
$$

$$
\begin{pmatrix} b_{11}^2 h_{11,t} + 2b_{11}b_{21}h_{12,t} + b_{21}^2 h_{22,t} \\ b_{11}b_{12}h_{11,t}+(b_{11}b_{22}+b_{12}b_{21})h_{12,t}+b_{21}b_{22}h_{22,t} & b_{22}^2 h_{22,t}+2b_{12}b_{22}h_{12,t}+b_{12}^2 h_{11,t} \end{pmatrix} + \quad (6)
$$

$$
\begin{pmatrix} \alpha_{11}^2 \varepsilon_{1,t}^2 + 2\alpha_{11}\alpha_{21}\varepsilon_{1,t}\varepsilon_{2,t} + \alpha_{21}^2 \varepsilon_{2,t}^2 \\ \alpha_{11}\alpha_{12}\varepsilon_{1,t}^2 + (\alpha_{11}\alpha_{22} + \alpha_{12}\alpha_{21})\,\varepsilon_{1,t}\varepsilon_{2,t} + \alpha_{21}\alpha_{22}\varepsilon_{2,t}^2 & \alpha_{22}^2 \varepsilon_{2,t}^2 + 2\alpha_{12}\alpha_{22}\varepsilon_{1,t}\varepsilon_{2,t} + \alpha_{12}^2 \varepsilon_{1,t}^2 \end{pmatrix}
$$

Without using matrices, in a bivariate case, the GARCH-BEKK model takes the form:

$$
h_{11,t+1} = c_{11}^2 + c_{12}^2 + \alpha_{11}^2 \varepsilon_{1,t}^2 + 2\alpha_{11}\alpha_{21}\varepsilon_{1,t}\varepsilon_{2,t} + \alpha_{21}^2 \varepsilon_{2,t}^2 + b_{11}^2 h_{11,t} +
$$
$$
2b_{11}b_{21}h_{12,t} + b_{21}^2 h_{22,t} \, (7)
$$

$$
h_{12,t+1} = c_{12}c_{11} + c_{12}c_{22} + \alpha_{11}\alpha_{12}\varepsilon_{1,t}^2 + (\alpha_{21}\alpha_{12} + \alpha_{11}\alpha_{22})\varepsilon_{1,t}\varepsilon_{2,t} +
$$
$$
\alpha_{21}\alpha_{22}\varepsilon_{2,t}^2 + b_{11}b_{12}h_{11,t} + (b_{12}b_{21} + b_{11}b_{22})h_{12,t} + b_{21}b_{22}h_{22,t} = h_{21,t} \quad (8)
$$

$$
h_{22,t} = c_{12}^2 + c_{22}^2 + \alpha_{12}^2 \varepsilon_{1,t}^2 + 2\alpha_{12}\alpha_{22}\varepsilon_{1,t}\varepsilon_{2,t} + \alpha_{22}^2 \varepsilon_{2,t}^2 + b_{12}^2 h_{11,t} +
$$
$$
2b_{12}b_{22}h_{12,t} + b_{22}^2 h_{22,t} \quad (9)
$$

where a_{11} is the coefficient of noise for the first series of equities; a_{12} is the coefficient of noise transmission from the second series of equities to the first series of equities; a_{21} is the coefficient of noise transmission from the first series of equities to the second series of equities; a_{22} is the coefficient of noise of the second series of equities;   is the coefficient of volatility for the first series of equities;   is the coefficient of volatility transmission from the second series of equities to the first ; b_{21} is the coefficient of volatility transmission from the first series of equities to the

second; h_{11} is the estimated volatility of the first series of equities; h_{22} is the estimated volatility of the second series of equities; h_{12} is the covariance between the second series of equities and the first series of equities; e_1 is the error term in the first series of equities; e_2 is the error term in the second series of equities; c_{11} is the constant coefficient of covariance for the first series of equities; c_{12} is the constant coefficient of covariance between the second series of equities and the first series of equities.

This model can be economised by imposing the following restriction on the above equation: $B'H_tB = 0$. The main limitation to estimating bivariate GARCH type models is the large number of parameters that have to be estimated when the log-likelihood function is maximised; this number is equal to $n*(n + 1)/2 + (p + q)*n2*(n + 1)*2/4$. Two possible restrictions are suggested in the literature. The first one is suggested by Bollerslev *et al.* (1988), in particular, they set $p = q = 1$ and make the matrices A and B diagonal, reducing the number of parameters in the log-likelihood function to $3n*(n + 1)/2$. This restriction eliminates the possibility of capturing any transmission between pricing series with the GARCH–BEKK model. It also provides a means of estimating two univariate GARCH processes where in the second one only conditional covariance estimates are considered. In particular, this model takes the form:

$$h_{11,t+1} = c_{11}^2 + \alpha_{11}^2 \varepsilon_{1,t}^2 + b_{11}^2 h_{11,t} \tag{10}$$

$$h_{22,t} = c_{11}^2 + c_{22}^2 + \alpha_{22}^2 \varepsilon_{2,t}^2 + b_{22}^2 h_{22,t} \tag{11}$$

$$h_{12,t} = h_{21,t} = c_{11}c_{22} + \alpha_{11}\alpha_{22}\varepsilon_{1,t}\varepsilon_{2,t} + b_{11}b_{22}h_{12,t} \tag{12}$$

$$h_{21,t} = h_{12,t} \tag{13}$$

The second restriction is suggested by Bollerslev (1990) who proposes that the correlation between variables to be time-invariant and, therefore, allows the covariance of equities to change and be equal to:

$$h_{ij,t} = p_{ij} (h_{ii,t} * h_{jj,t})^{1/2} \tag{14}$$

This could reduce the number of parameters in the log-likelihood function, allowing each individual variance to behave as a univariate GARCH (p, q) process and also resulting in a small number of $3n + n*(n + 1)/2$ parameters. In this case, the GARCH-BEKK model takes the form:

$$h_{11,t} = c_{11} + \alpha_{11}\varepsilon_{1,t}^2 + b_{11}h_{11,t} \tag{15}$$

$$h_{22,t} = c_{22} + \alpha_{22}\varepsilon_{2,t}^2 + b_{22}h_{22,t} \tag{16}$$

$$h_{12,t} = h_{21,t} = c_{12}\sqrt{h_{11,t} * h_{22,t}} \tag{17}$$

$$h_{21,t} = h_{12,t} \tag{18}$$

where,

$$c_{12} = Q(1,2)/\sqrt{(c_{11} * c_{22})} \quad \text{and} \quad Q(1,2) \text{ is the covariance matrix.} \tag{19}$$

The above three models govern a different covariance equation. Hence, it is not clear whether the parameters for h_{12} are just the result of the parameter estimates for h11 and h_{22} or if the covariance equation alters the parameters estimates of the variance equations for the above equations.

5. Empirical Results

In this section we present and discuss the findings of our empirical analysis. We employ multivariate GARCH–BEKK–CAPM models to explore the dynamic of spillovers between the log difference of twin equities and their respective stock exchanges where they are listed. We examine this issue having or not as explanatory variables in the return equations of the models the exchange rates between the currencies in which locally these twin equities are traded and also the exchange rate of one of the local currency of the twin equities against the US dollar currency. In addition, we take into account in the residual equation of the return series the impact of systematic betas on the log price difference of the twin equity. For more details in this specification, see the section above where this is shown with specific equations.

5.1. Results of spillovers between Royal Dutch-Shell and the respective exchange

Table 3, Panel A and B report the results from estimating the multivariate GARCH-BEKK-CAPM model without and with explanatory variables of two exchange rates, a local and a global one. We test the null hypothesis of no spillovers and systematic beta effects against the alternative that there are spillovers and systematic beta effects. The null hypothesis is equivalent

to a segmented European stock market where there is no link between arbitrage and stock exchanges and the alternative is that there is an integrated stock market where there is a link between arbitrage and stock exchanges. The T-Statistic is used to employ this hypothesis.

Table 3: *Information Transmission Results from a CAPM-GARCH multivariate framework for Royal Dutch price premium, Paris, German and Brussels stock exchanges:*

		ROYLDS **Paris** **German** **Brussels**
	Coefficient (Std. Error)	T-Statistic (Signif. Level)

Panel A: A Simple Approach

	Systematic Beta Effects	
From Paris to ROYLDS	0.001 (0.004)	0.34 (0.73)
From German to ROYLDS	0.001 (0.005)	0.22 (0.83)
From Brussels to ROYLDS	−0.002 (0.005)	−0.47 (0.64)
	Error Transmission	
From Paris to ROYLDS	0.089 (0.031)	2.86 (0.004)
From German to ROYLDS	0.12 (0.027)	4.47 (0.00)
From Brussels to ROYLDS	0.10 (0.019)	5.49 (0.00)
From ROYLDS TO German	0.16 (0.057)	2.91 (0.004)
From ROYLDS to Brussels	0.17 (0.073)	2.37 (0.018)
Log-Likelihood	50054.83	

Panel B: Considering Two	**Explanatory Variables in the** OLS: NLGTGBP and NLGTU$	
	Systematic Beta Effects	
From Paris to ROYLDS	0.008	1.20
	(0.007)	(0.23)
From German to ROYLDS	−0.001	−0.31
	(0.004)	(0.76)
From Brussels to ROYLDS	−0.008	−2.81
	(0.003)	(0.005)
	Error Transmission	
From Paris to ROYLDS	−0.078	−3.093
	(0.025)	(0.002)
From German to ROYLDS	0.097	5.062
	(0.019)	(0.00)
From ROYLDS to Paris	0.13	2.89
	(0.044)	(0.004)
From ROYLDS to German	0.33	7.19
	(0.046)	(0.00)
From ROYLDS to Brussels	0.26	4.61
	(0.055)	(0.00)
Log-Likelihood	49561.85	

Notes: ROYLDS means Royal Dutch-Shell. NLGTGBP means the exchange rate of Netherlands currency to Great Britain Currency and NLGTU$ means the exchange rate of Netherlands currency to US dollar currency.

In Panels A and B, we report that the log-likelihood value of the multivariate GARCH-BEKK-CAPM models is almost equal, 50054.83 (in Panel A) and 49561.85 (in Panel B). This shows that the variance between the two Panels is equal. Significant spillovers exist only for the noise changes and not for the price changes as it is shown from the results of Table 3. In particular, Panel A shows that there is spillovers from Paris (German or Brussels) to (Royal Dutch–Shell) twin difference and only German and Brussels is influenced by the twin equity difference of (Royal Dutch-Shell). This means that the difference in stock price of (Royal Dutch-

Shell) is well integrated with the foreign stock exchanges where there is a listing. A similar result is observed in Panel B. In particular, there is spillovers from Paris (German) to (Royal Dutch – Shell) twin difference and Paris, German and Brussels is influenced by the twin equity difference of (Royal Dutch-Shell). Again, this is supportive of a well integrated European stock market.

In addition, the systematic beta effects are not significant in Panel A while in Panel B is significant for the Brussels stock exchange. This means that the covariance ((Royal Dutch-Shell), stock index of Brussels) / Variance (Royal Dutch-Shell) affects the variance of the twin equity of (Royal Dutch-Shell) in Panel B. This also means that there is country-specific risk from Brussels stock exchange which affects the arbitrage difference of the twin equity difference of (Royal Dutch-Shell) in Panel B.

To sum up, taking the results of the two cases, Panel A and Panel B, we could say that there are no extremely significant differences for the direction of spillovers and also the systematic beta effects which arise from the covariance (1,2) / variance (1,2) of the two variables under investigation. This means that the inclusion of the two explanatory variables of exchange rates (one local and one global) do not add new value in the market integration process and systematic beta. There are only few changes in the integration process and systematic beta effects but these are minor taking into account the whole integration process under consideration. Therefore, the results between the two panels (A and B) are quite similar.

Table 4 (Panels A and B) report the results of spillovers between the log price difference of (Royal Dutch-Shell) and the stock exchanges of Luxembourg and Zurich and also the systematic beta effects from Luxembourg and Zurich to (Royal Dutch-Shell) difference without and with explanatory variables of exchange rates. In contrast to the results of spillovers of the log price difference of (Royal Dutch-Shell) and the stock exchanges of Paris, German and Brussels, here we have found that the explanatory variables of the exchange rates of Netherlands currency to Great Britain pound and the Netherlands currency to US dollar add value on the European integration process. This happens because the transmission of volatility from Luxembourg (Zurich) to (Royal Dutch-Shell) and also from (Royal Dutch-Shell) to Zurich found to be significant

in Panel B of Table 4, while previously in Panel A of table 4 these effects do not exist. Therefore, we can conclude here that the explanatory variables of exchange rates are important in order to understand the dynamics of spillovers between markets.

Table 4: *Information Transmission Results from a CAPM-GARCH multivariate framework for Royal Dutch price premium, Luxembourg and Zurich stock exchanges:*

	ROYLDS Luxembourg Zurich	
	Coefficient (St. Error)	T-Statistic (Signif. Level)
Panel A: A Simple Approach		
Systematic Beta Effects		
From Luxembourg to ROYLDS	0.001 (0.002)	0.50 (0.61)
From Zurich to ROYLDS	−0.001 (0.003)	−0.073 (0.94)
Error Transmission		
From Luxembourg to ROYLDS	0.051 (0.015)	3.41 (0.00)
From Zurich to ROYLDS	0.10 (0.013)	7.71 (0.00)
From ROYLDS to Zurich	−0.23 (0.034)	−6.68 (0.00)
Log-Likelihood	38018.84	

Panel B: Considering Two **Explanatory Variables in the** OLS: NLGTGBP and NLGTU$

Systematic Beta Effects		
From Luxembourg to ROYLDS	−0.002	−1.15
	(0.001)	(0.25)
From Zurich to ROYLDS	−0.001	−0.43
	(0.002)	(0.25)
Volatility Transmission		
From Luxembourg to ROYLDS	−0.64	−8.95
	(0.071)	(0.00)
From Zurich to ROYLDS	0.66	5.077
	(0.13)	(0.00)
From ROYLDS to Zurich	−0.36	−4.74
	(0.075)	(0.00)
Error Transmission		
From Zurich to ROYLDS	−0.15	−4.82
	(0.031)	(0.00)
From ROYLDS to Zurich	0.15	3.29
	(0.045)	(0.001)
Log-Likelihood	37882.88	

Notes: ROYLDS means Royal Dutch-Shell. NLGTGBP means the exchange rate of Netherlands currency to Great Britain Currency and NLGTU$ means the exchange rate of Netherlands currency to US dollar currency.

5.2. Results of spillovers between (ASEA-ABB) and the respective exchanges

Following our previous findings that there is a well integrated European market considering the spillovers between the variables of (Royal Dutch-Shell) and the respective stock markets in which the above mentioned twin equity is listed, we further also consider a GARCH-BEKK-CAPM model to measure the level of integration of the (ASEA-ABB) and their respective stock markets in which the above mentioned twin equity is

listed. In addition, we also measure the systematic beta effects which arise from the relevant stock exchanges in which the twin equity is listed to the log stock price difference of (ASEA-ABB). We also employ a similar analysis for the difference of the twin equity of (ASEA-ABB) and the respective stock markets on which is listed taking into consideration two explanatory variables of exchange rates (Swedish Crone to Swiss franc and Swedish crone to US dollar) in the return equation (1).

Table 5, Panel A reports the results for the GARCH-BEKK-CAPM model without including in the return equation (1) any exlanatory variables. This panel testing for volatility and error spillovers between the above mentioned variables, where the null hypothesis is of no volatility transmission, error dependence and systematic beta effects and the alternative is that there is volatility transmission, error dependence and systematic beta effects. The null hypothesis of no error dependence is rejected in favour of the alternative of error dependence on the basis of the significantly unilateral transmission of noise from (ASEA-ABB) to Copenhagen (German) stock exchange. However, we can not reject the null hypothesis of no volatility transmission between the above mentioned variables and systematic beta effects from the stock indexes to the log price difference of (ASEA-ABB). This means that there is partly noise dependence (partly integration), which is well captured by the GARCH-BEKK-CAPM technique.

Table 5: *Information Transmission Results from a CAPM-GARCH multivariate framework for ASEA-ABB price premium, Copenhagen, and German stock exchanges:*

		ASEAABB Copenhagen German
	Coefficient (St. Error)	T-Statistic (Signif. Level)

Panel A: A Simple Approach

	Systematic Beta Effects	
From Copenhagen to ASEAABB	−0.001 (0.038)	−0.001 (0.99)
From German to ASEAABB	0.001 (0.028)	0.001 (0.99)

Error Transmission		
From ASEAABB to Copenhagen	3.66	4.17
	(0.88)	(0.00)
From ASEAABB to German	1.33	4.054
	(0.33)	(0.00)
Log-Likelihood	23577.15	

Panel B: Considering Two   **Explanatory Variables in the** OLS: NLGTGBP and NLGTU$

Systematic Beta Effects		
From Copenhagen to ASEAABB	0.002	0.71
	(0.003)	(0.47)
From German to ASEAABB	0.001	0.015
	(0.005)	(0.98)
Volatility Transmission		
From Copenhagen to ASEAABB	−0.18	−2.31
	(0.077)	(0.021)
From ASEAABB to Copenhagen	0.34	2.52
	(0.14)	(0.012)
From German to ASEAABB	0.24	1.97
	(0.12)	(0.049)
From ASEAABB to German	−1.43	−5.028
	(0.28)	(0.00)

Error Transmission		
From Copenhagen to ASEAABB	−0.16	−13.24
	(0.012)	(0.00)
From ASEAABB to Copenhagen	−0.23	−2.52
	(0.089)	(0.012)
From ASEAABB to German	0.33	3.56
	(0.093)	(0.00)
Log-Likelihood	35348.39	

Note: ASEAABB means ASEA-ABB. SEKTSWISS means the exchange rate of Swedish crone currency and the Swiss franc currency and SEKTU$ means the Swedish crone currency to the US dollar currency.

The results for testing for transmission spillovers and systematic beta

effects between the above mentioned variables with explanatory variables of exchange rates (see above) in the return equation (1) are reported in Panel B. Not only can the null hypothesis of no error dependence be rejected but also the null hypothesis of volatility transmission. The results of the null hypothesis of no systematic beta effects can not be rejected here as well. Comparing this result with the results from Panel A with respect to the level of integration process, we observe that in Panel B the integration process defined well and not only partly as mentioned for Panel A. This result here suggests that there are bilateral volatility and noise spillover effects and therefore a different level of integration is evident. The Log-likelihood value of Panel A and B further supports this finding.

To sum up, table 5 (Panel A and B) shows that there is a lower level of integration between the log difference price of (ASEA-ABB) and the stock markets of Copenhagen and German without any explanatory variables of exchange rates in the return equation 1 than with explanatory variables. These results provide evidence of co-movement between relative twin prices and the market indexes for long horizons.

6. Conclusions

This paper presents evidence that stock price differences (arbitrage) affected by the location of trade. The co-movements between price differentials (arbitrage) and market indexes are present at long horizons.
Here we examined the volatility and noise spillovers and also the systematic beta effects which might arise between the log price difference of (Royal Dutch-Shell) and the respective stock market indices where the twin equity is listed and we also did the same for the (ASEA-ABB) twin equity difference and their respective stock indexes where the twin equity is listed.

The results reveal that the level of integration is affected by both the location of trade and the explanatory variables of exchange rates which are included in the return equation (1) of the GARCH-BEKK-CAPM model. Evidence on volatility and noise spillovers indicate that the relation between arbitrage and stock market integration is well captured showing a well integrated market in most of the cases where examined here. In addition, the systematic beta effects which might arise from the stock

exchanges back to the twin price difference (arbitrage) is not present. Our results are in line with those of Froot and Dabora (1999) who found that the difference between the prices of twin stocks appears to be correlated with the markets on which these are listed.

NOTES

1. To make foreign investment for British investors even more disadvantageous, the British government impose an implicit tax on foreign investment in 1965. This so=called 'surrender rule' requires 25 percent of all foreign security sales, dividends, and interest to be surrendered at the existing (lower) noninvestment spot rate of exchange. These restrictions end on October 23, 1979.

2. King et al. (1994) suggest that the construction of covariance between markets on the basis of economic data is difficult.

3. This model takes into account the autocorrelation factor for returns and resuduals.

4. To measure the relative comovement of twin prices, Froot and Dabora (1999) regress the twin's log differential on US, UK, and Dutch market index log returns plus the relevant log currency changes.

5. This is important for smoothing the series for calculating the conditional volatility of returns according to the data. In this way, we transform the non-linear GARCH-BEKK model into a stochastic model.

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FINANCIAL INNOVATIONS EFFECTS ON MONETARY POLICY MAKING

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Abstract

The dynamics established by the innovations on financial markets since the mid–seventies have raised a whole series of new problems regarding both the theoretical approach to and the implementation of a policy of monetary control. Thus, there are reasons to doubt the possibility of effectively controlling the money supply in a situation characterized by radical financial innovation. Careful analysis of the causes of financial activities reveals that closer substitution relationships evolve between the specific financial elements, of which the total money supply consists, that affect the relationship between the monetary and real figures of the economy. This finding leads to the need for a redirection in monetary policy formation by the central banks.

JEL classification: E5, E51, E52, G1, G38.
Keywords: Financial Innovations, Monetary Policy.

1. Introduction

The financial sector is in a state of major transformation globally. This is a long term situation which has been apparent for almost three decades, with increasing intensity. Major contributors to this situation, which is expected to continue during the next years, are financial innovations. Financial innovations include important technological improvements in payment systems (Point of Sale Banking, Chip Card), in financial instruments (e.g. Cash Management Systems), new investment products (e.g. Negotiable Orders of Withdrawal–Now, Certificates of Deposits–CD), as well as the increase of existing and the evolution of new secondary markets for financial instruments trading. Evolving from the United States, the new trends have embraced global financial markets with revolutionary dimensions[1].

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Among other repercussions, financial innovations have a significant effect on the stabilizing feature of the quantity of money in circulation, on the money supply process, on the money demand, as well as the impact of monetary stimulus on the real economy[2]. Recognized and established relationships between fiscal and real economy figures alter through the introduction of these novelties with important consequences on the monetary policy. One of the major effects of innovation, as a result of technological progress in this sector, is the reduction of the cost of data gathering, elaboration and transmission. Also, the markets' deregulation measures, which are accompanied by the introduction of innovative products, lay the foundations for the growth of existing non–banking financial organizations and for the creation of new ones.

According to the monetary theory, money is a medium of exchange for transactions and a medium for store of value, as well as a unit of account. This service is provided mainly by the Central Bank and the banking sector, both regulators of the money supply in the economy. A large set of financial instruments are used partly as a medium for payments and for store of value, so they are taken into account in the calculation of various figures regarding money supply. Their participation in money supply is measured with a level of uncertainty. As limits broaden, the importance of the store of value function of these financial instruments becomes more critical.

In recent years, the initial barriers between differentiated functions each type of instrument delivers have started to dissolve, mainly due to the development of new instruments, initially in U.S.A. and Great Britain, which are both interest–bearing and checking accounts (accounts NOW, Money Market Funds, Overnight Repurchase Agreements (RP) etc.). In these types of accounts the limits between transactions facilitation and profitable activity are not apparent, so those two functions cannot be separated. Additionally, the emergence of new and the growth of existing secondary markets, the reduction of transactional cost and the minimization of processing time are factors that contribute to the evolution of many innovative financial products. This is the reason that central banks try to redefine the components of money supply.

As a result of the continuous incorporation of new innovative financial instruments, the validity of many partial definitions related to money is restricted in many developed countries. A monetary policy that is based

exclusively on the growth of one function of money is problematic[3]. It is doubtful that this problem can be solved in the long term, in a global deregulated banking market, whose main features are the intense competition and a variety of innovative products.

2. Changes in money supply and demand

Due to the observed reduction of reserves in cash and deposit accounts and the conversion of private portfolios to assets, a great part of which are not subject to bank reserves requirements, the capacity for credit facilities and increase in money circulation grows proportionally. Thus, in order to implement a successful monetary policy, it should be based on credible predictions on the consequences of innovations and their evolution in the future.

Regarding the impact of interest rates in banks' lending activities, we should expect that, in the near future, the margins between funding and lending rates will have an increasingly critical role. On both the assets and liabilities sides of a bank's balance sheet, the share of assets whose yield is arranged by the market operations has a rapid growth. Thus, regardless of changes in basic interest rates, if the margin between funding and lending rates is fixed, there is no impact on their lending activities. The relationship between the credit expansion and the real economy becomes more direct: changes in the level of nominal interest rates increase, but the bank's appetite for credit expansion remains invariable, due to the proportionally same increase in lending and funding rates, which leaves the spreads at the same level.

As already mentioned, financial innovations alter the share of each asset class in the balance sheet. Changes like these apply to the development of new investment instruments and have a strong impact on the confusion emerging from the definitions of money and other financial instruments. Changes in investment selections of individuals have a negative effect on the growth of the so–called narrow money supply. Significant problems arise for monetary policy makers who are obliged, according to the level of growth of money supply, to differentiate changes evolved from shifts in investment behavior and those, which are the result of changes in the economic

conditions. In most developed countries, the structural changes derived from money demand are reported and elaborated as "missing money".

3. Reduction of money demand as a medium of exchange for transactions

With the analysis of the effects of innovations on the transmissions mechanism, in a simple case study portfolio example of Brunner Meltzer or Tobin type, it is obvious that the effectiveness potential of monetary policy measures in the real economy changes and the reserves of money for transactions, as an automatic stabilizer, are reduced. Financial innovations reduce the need for transactional media, increase the level of readjustments between different classes of assets, and increase the share of those, whose yield depend more on the market for the total of individuals' assets.

An increase of the money supply results in a similar increase in the total assets of the private sector. Assuming income is at a fixed level, a small share of the assets is used as a medium of exchange for transactions. Also, many reallocations take place, increasing the share of other financial instruments and economic capital. The price for existing economic capital is rising. Assuming the production cost is at a fixed level, investments in economic capital become more attractive and the economic activity is strengthened. Assuming the share of cash reserves for transactions in the total assets is being reduced, every increase of the money quantity acts in the reallocation process in favor of the other financial instruments, which facilitate the expansive result of investments. Thus, the effectiveness of monetary policy is enforced and the same results over the real figures can be attained with a lower level of money supply expansion.

On the other hand, the effects of increased government expenditure (debt) rely on the substitution relationships between financial and capital assets. This is the reason that they are not as obviously identified. As a result, an open market purchase of debt instruments, for example by the central bank, which increases the money in circulation in the economy, reduces simultaneously the quantity of government bonds held by the private sector, when the need for reduced cash reserves for transactions increases.

4. Closer substitution relationships

The assets readjustments and the reduced expenditure for the informational and transactional cost eliminate the substation gap between different investment options. In this case, an increase in the quantity of money has a less expansive impact, because with equal quantitive changes, comparatively small changes in rates of return can restore investors' portfolio balance. In this situation, the expansionary effect has a comparatively low impact on the market of newly produced economic capital.

Possible crowding–out effects of substitution in increased government expenditure (debt) are limited because of a strong substitution relationship between specific financial instruments, although the increasing differentiation between economic capital and financial assets broadens the substitution gap between them. In a possible government debt increase, investors turn to capital assets in order to hedge more effectively the total risk of their portfolio. In case the substitution gap between capital and financial assets decreases, due to the reduced transactional cost for example, then an increase in government debt leads to limited effects from their portfolio restructure.

Due to the weak effects of a money supply increase with the above described financial innovations, an expansionary open market policy cannot produce significant results. Normal changes of money reserves for transactions, which depend on the level of income, are also very restricted. In case, for example, the gross national income increases, necessary readjustments in the portfolio will imply small changes in the rate of return of the non–financial assets. The rate of return of the existing economic capital will grow with slightly higher rate in comparison with the marginal productivity rate of the new for production economic capital. Also, the restrictive effect has a low impact.

5. The increase of investment instruments with yields arranged by the market

In order to achieve an effective monetary policy through portfolio restructuring impact, an asset with fixed yield is necessary. In case the

supply of this asset changes, for example cash, the market is unable to balance, given a change of its rate of return. The rate of return of the other assets should continuously change, until the readjusted portfolio balance is compatible with the fixed rate of return assumed. This rate of return is also a benchmark for the required readjustment of the other assets, especially of the capital ones. An intense expansion of financial assets with yields arranged by market operations in investors' portfolios is possible to counterbalance all this chain reactions.

In the extreme scenario, in which all financial assets have a yield arranged by the open market, then no asset would have a fixed rate of return and the monetary policy would have no benchmark, in order to try to have an impact in the rate of return of the economic capital. In a money supply increase, the money market will be swept with an increase of rate of return of money. The rates of return of the rest assets would be almost unaffected by these changes, which means that no one could have the power to affect the yield of economic capital and, therefore, the capital investment activity.

Facing the situation as a whole, we note that the flexibility of the financial sector is reduced and the monetary policy measures directly affect the real economy, requiring special handling from the monetary policy decision makers. If average monetary policies activity is slowing down or growing, in other words the effect of the continuously reduced money reservation for transactions prevails against the effect of closer substitution relationships in combination with the empowered role of the market in the settlement of the yields, is impossible to be proved. This problem can only be handled through research in real situations.

In any case, it should be expected that the standing relationships between financial and real economy figures, for example the velocity of circulation, change and consequently there is a negative impact in the effectiveness of the monetary policy. A policy exclusively directed to the market regulation with the use of the level of money supply is the first one to be gradually considered as inefficient. Monetary policy decision makers should seriously consider the other economic figures. So, the breadth for intervention potential for central banks is restricted, which until now tried with intermediate targets, related either with the level of money supply or with the level of interest rates, to affect the economic cycle with an ultimate target of stabilization.

6. Conclusions

Technological evolution in data elaboration and transmission along with the abolition of many regulations related to the operations of the banking market are the main components of the burst of innovative products development in the sector.

The innovative credit instruments increase the business opportunities for existing and reinforce the establishment of new financial intermediaries and reduce the informational and transactional cost in the financial sector.

A direct effect is a diminished need for cash reserves for transactions, as well as closer substitution relationships between financial assets. Due to the intense competition identified in the banking sector, the share of assets whose yields are derived from the market is increasing resulting in an improvement in the effectiveness of financial intermediaries.

Portfolios restructuring in the direction of assets with low or no participation in the required bank reserves in the central bank is expanding the growth opportunities for lending by the financial intermediaries. The growth of lending depends more on the margin between lending and deposits rates rather than the nominal level of rate.

With the introduction of financial innovations, the impact of the monetary policy measures on the real economy figures becomes more direct, although in the financial sector flexibility is reduced. Thus, requirements for the monetary policy makers become more demanding.

Although the decreased need for cash reserves to facilitate transactions improves the real effect of monetary measures, the enhanced substitution relationships between financial assets and the increasing impact of the market in the yield of these assets have a negative effect.

In a probable introduction of regulatory measures in the financial market, circumvention reactions from the private sector should be expected. These can counterbalance the planned effects of the monetary policy as they can produce significant structural changes.

In an innovative environment, the relationships between monetary and real economy figures are constantly shifting. Thus, policies strictly directed towards controlling the money supply, are losing ground. Monetary policy should take into account the conditions in other economic figures. The

central banks' focus in the standard rules that arrange the operations of the economy already belongs to the past.

NOTES

1. Regarding this positioning, the former President's of Federal Reserve Bank of New York stated: "As I am sure everyone is aware, we are in the midst of a wave of innovation in the financial industry that amounts to a veritable revolution", A.M. Solomon, Financial Innovation and Monetary Policy: remarks given at a luncheon by the American Economic and American Finance Associations on Monday, December 28, 1981, in Washington DC. In: Federal Reserve Bank of New York, Annual Report 1981, p.3.

2. The extensions of financial innovations in the macroeconomic field became a lecture subject after the introduction of this topic in the study of R. J. Gordon. Macroeconomics, 3rd ed. Boston, Toronto, 1984, Chap. 4, 11, 15, 16.

3. The nature of innovations incorporates the element of odd changes, which are not part of everyday life. Thus, Friedman's main prerequisite for the regulation of monetary policy was set aside due to new conditions, and, according to empirical observation, a stable money demand. Supporters of this concept are opposers to Friedman's theory, including W. D. Mc Clam: U.S. Monetary Aggregates, Income Velocity and the Euro–Dollar Market; BIS Economic Papers, No.2 1990, Basle P.5: "Previous demand–for–money relationships have tended to break down as a result of rapid institutional and technological change", as well as some followers of his ideas, i.e. D. Laidler: Monetarism: An Interpretation and an Assessment, in The Economic Journal, 91, P.4: "Ten years ago it was possible to argue that this characteristic monetarist belief in a stable demand for money function was well supported by empirical evidence as I did… However, the last decade has produced a good deal of evidence to suggest that the

relationship has shifted in an unpredicted way in a number of countries".

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ACCESS PRICING
FOR ELECTRICITY TRANSMISSION SYSTEM

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Abstract

In this paper we discuss the efficient component pricing rule (ECPR) developed by Baumol and Willig for the access to the interconnected electricity system under competitive conditions. We compare this rule with the Ramsey and the accounting pricing rules and we propose the cost formula for ECPR. The Independent System Operator (ISO) should charge bulk power traders a per unit ex ante transmission access fee equal to the sum of direct cost plus the opportunity cost. The implementation of this formula ensures that (a) independent rivals enter the electricity market only if their marginal cost of production is lower than the marginal production cost of the electricity supply industry (Public Power Corporation) and (b) the electricity supply industry is in the position to afford the Public Service Obligations (PSO).

JEL classification: H41.

Keywords: Access Pricing, Efficient Component Pricing Rule, Ramsey Pricing Rule, Accounting Pricing Rule, Networks, Electricity, Transmission.

1. Introduction

Transmission access pricing is one of the basic instruments of any restructuring scheme aimed at promoting open access and competition in electricity market. Under competition the number and the volume of electricity transmission transactions are increased. Therefore, changes are needed to ensure expansion of the transmission infrastructure by developing standard market rules.

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The electricity industry, as well as gas, telecommunications, water and railway services are industries involving transportation lines and distribution networks. The transmission systems of these industries exhibit natural monopoly characteristics. This means that for each industry it would be inefficient for more than one firm to construct new lines or parts of its corresponding system. Thus it is generally recognized that local distribution and national networks are natural monopolies. When competition exists in the production stage of the electricity industry, rival producers will often need to gain access to the electricity system in order to supply their output to consumers.

Network access pricing for electricity transmission system by electricity producers should aim at the attainment of productive and distributional efficiency. This will occur when access prices are set equal to the marginal cost of access provision. If the access price is set over the corresponding marginal cost, then the transmission system will not be deployed efficiently.

However, a serious problem caused by the application of marginal pricing is that when firms enjoy economies of scale, the pricing policy on marginal cost usually results in the emergence of accounting losses. In such cases, firms that apply the marginal pricing policy should receive compensation, in order to remain in profit. It is, however, known that this compensation causes, in parallel, disturbances in other sectors of the economy. If we take into consideration the presence of such disturbances, it is not certain any longer that access pricing for the transmission system, within the framework of marginal cost, actually comprises an efficient pricing policy.

2. Previous Research on the Field

The access pricing problem is of principal importance in recent regulatory economic literature. **N. Economides** and **L. White** (1995) criticised some of the properties of the ECPR for access to a monopoly facility. They focused on the case in which an entrant/rival and the bottleneck monopolist both produce a complementary component to the bottleneck service. They argued that if the monopolist's price for the

complementary component is above all relevant marginal costs, the ECPR's exclusion of rivals might be socially harmful, since it may be preventing a substantial decrease in the price of the complementary component. Furthermore, **M. Armstrong**, **C. Doyle** and **J. Vickers** (1996) analysed the relevant notion of "opportunity cost" to the integrated access provider, which is included in the Baumol-Willig ECPR, under various assumptions concerning demand and supply conditions, including product differentiation, bypass, and substitution possibilities, which all reduce opportunity cost compared to the benchmark case. They showed that the Ramsey approach to access pricing is closely related to the ECPR, provided that the opportunity cost is correctly interpreted. **M. Armstrong** and **J. Vickers** (1998) extended this analysis to the case of retail price deregulation. They showed that the optimal access price might be above, below or equal to marginal cost. The optimal regulation of the margin between the retail price and the access price entails the ECPR, and the welfare and entrant profit are higher when the level of the access price, rather than the margin, is regulated. In a more recent study D.Weisman (2002) argued that the ECPR is generally favored by vertically integrated providers and opposed by independent rivals. According to his analysis, the vertically integrated provider earns either monopoly or competitive profits in equilibrium under the ECPR, depending upon its relative efficiency downstream.

On the other hand, **M. Boyer** (1997) presented some general principles and fundamental facts and issues, as well as the basic procedures through which competition can be introduced in telecommunications markets. The ECPR, the Ramsey pricing rule and the Global Price Cap rule were compared. Also, **J. Gans** and **P. Williams** (1998) reviewed recent advances in regulatory theory concerning the effect of access pricing regulation on incentives to invest in infrastructure. Their study provided a rationale for using fixed access charges to allocate investment costs so as to ensure timely investment and competition. A more recent paper by **R. Turvey** (2001) is about pricing access to infrastructure, such as distribution networks, wire and cable networks, rail networks or pipe networks and airports or seaports. The discussion is focused on pricing to achieve economic efficiency as understood by economists, subject to various constraints. The author concludes that the optimal pricing rules for access

are no different from those for any final product, when the access provider provides only access. Things become more complicated when the access provider both provides access to others and also uses the system. **R. Hern** (2001) examined the legal and economic arguments for the setting of charges for access to essential facilities in the water sector in England and Wales. He focused on the economic arguments for and against the application of the ECPR for the setting of access charges.

Moreover, **M. Boyer** and **J. Robert** (1997) reviewed some general principles and fundamental facts and issues concerning deregulation, restructuring and privatization in network industries in general and in the electricity industry in particular. They compared the ECPR with the Ramsey-Boiteux pricing rule and they discussed the Global Price Cap Rule. **A. De Vany** (1997) also examined how well the energy spot market was doing. He developed a model of power and transmission pricing in a network of markets where power flows obeyed the complex physics of relative flows in a network rather than contract paths. In a more recent study **P. Joskow** and **J. Tirole** (2000) analysed whether and how the allocation of transmission rights associated with the use of electric power networks affects the behaviour of electricity generators and consumers with market power. Their analysis focused on a two-node network where there were cheap generating supplies in an exporting region and expensive generating supplies in an importing region. Furthermore, **S. Deng** and **S. Oren** (2001) proposed a priority-pricing scheme for zonal access to the electric power grid that is uniform across all buses in a zone. The ISO charges bulk power traders an ex ante transmission access fee per unit. The zonal access fee serves as an access insurance premium that entitles a bulk power trader to either physical injection of one unit of energy or a compensation payment.

3. The Baumol-Willig model

The above discussion suggests that recent studies have contributed significantly to the formation of concepts on the subject of access pricing and it has become obvious that there are several alternative methods for setting prices within a *second best* framework.

In this framework, the method that has widely been accepted is the

Baumol–Willig pricing rule. According to this rule, we assume that the setting of electricity prices is carried out in two stages: prices to the final consumer are set first and then the corresponding access prices for the transmission system are defined at the level where welfare is maximised under the constraint that electricity prices to the final consumer are already given.

It should be noted that because the prices to the final consumer are set beforehand, consumer welfare and distributional efficiency are not affected by the determination policy on access pricing for the transmission system. Hence, the appropriate level of welfare is determined only on the basis of productive efficiency. Thus, the aim of the intervention for the determination of the access prices is to minimise total production costs.

It is obvious that this aim can be achieved by the determination of access prices for the transmission system, which will allow the entry of a new independent electricity producer, only when he can produce at a lower cost than the Public Power Corporation of Greece (PPC).

To prove this, we suppose that PPC provides power to consumers who are connected with the transmission system, which is PPC's property, but it is under the operation of the Independent System Operator (ISO). The utilisation of the transmission system exhibits the characteristics of natural monopoly. We assume that a private electricity producer (PEP) attempts to gain access to the market by supplying electricity to a customer who has the right to choose his supplier. Because of the prohibitive cost from the construction of a new transmission line connecting the PEP with the consumer access of the PEP to the transmission system is required. In order to present the issue, we also assume the following:

- PPC's marginal cost for the provision of one kWh to the supplier is $a+b$ monetary units. a stands for marginal production cost and b is the transmission marginal cost

- The price of electricity to the supplier has been set at the price of $a+b+c$ monetary units. The fact that this price has been set higher than the marginal production and transmission costs by c monetary units, could be attributed to collective expenditures that should also be covered for public service obligations assigned to PPC by the State.

- PEP's unit cost is C_i per kWh. PEP will be cheaper than PPC to his relevant supplier, if $C_i < a$.

- The access price for PPC's transmission system is set equal to x monetary units.

The problem that arises it is to determine an access prise x which will ensure that the entry of a PEP in the electricity market will take place only when its production cost is lower than PPC's.

Using the above symbols, we define the prise at which the PEP will offer a kWh to its supplier as equal to $(x + C_i)$ and the entry of the PEP in the electricity market will be profitable if

$$a + b + c > x + C_i$$

Therefore, the entry of the PEP in the competitive electricity market will take place when

$$C_i < (a + b + c) - x$$

But we want also that the entry of the PEP in the market to take place only when $C_i < a$. This means that the formula:

$$(a + b + c) - x = a$$

is valid.

Therefore, the access price to be charged for using the transmission system should be set at the level $x = b + c$ monetary units.

This access price for the transmission system exceeds PPC's corresponding marginal cost for the provision of access services by ISO, which is b monetary units. If the access price for the transmission system was to be set at $x = b$ monetary units/kWh, the result would be that the PEP would reckon that its entry in the electricity market is profitable, even if its unit cost is higher than PPC's marginal cost. Consequently, the result would be the entry of inefficient PEPs in the competitive power market. Additionally, by not charging the uplifts c per kWh, PPC will be unable to finance collective expenditures resulting by public service obligations.

According to this analysis, if the price for power is $\mathbf{p}$ and PPC's marginal cost for the production of one kWh is C_δ, then the optimal access price for the electricity transmission system is given by the difference:

$$x = p - C_\delta$$

This access price for the transmission system in question ensures the following: Firstly, the entry of a new PEP in the electricity market is

realised only when $C_i < C_\delta$ and secondly, when the entry has been realised, PPC will continue to cover the cost emerging from the implementation of the public service obligations.

The above equation can also be expressed as

$$x = C_\mu + (p - C_\mu - C_\delta)$$

where C_μ represents marginal transmission cost, which is charged by the ISO to all producers and the term in parenthesis represents uplifts to cover public service obligations, the cost of auxiliary services, etc. This term represents therefore PPC's opportunity cost for the provision by the ISO the use of the transmission system to the PEP.

We can express the above formula in words as follows:

Optimal access price for the use of the transmission system	**=**	**Direct transimission costs** **+** **Opportunity cost for providing the system access**
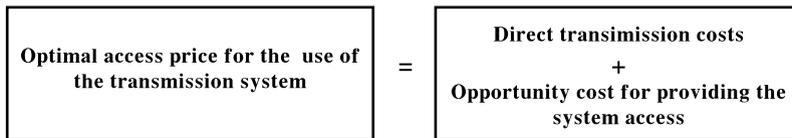
This expression is known as the efficient component pricing rule (ECPR) or as the Baumol-Willig rule. This rule could also be stated as follows:

> The *per unit* access price **x** for the transmission system should be set equal to the selling price **p** minus PPC's marginal production cost C_δ.

The per unit access price x for the transmission system should be set equal to the selling price p minus PPC's marginal production cost $C\delta$.

It is important to note that in an integrated power system the following may occur:

- The direct cost of a single access to the transmission system could be different from the system's marginal cost. This could happen in the case where the single access would decrease total losses of the whole integrated power system.
- The second term of the formula could be negative. In this case, the access price would be set lower than the direct cost for access provision. This would happen in the case where **p** (the price charged

at the exit of the transmission system) is lower than PPC's marginal production and transmission costs.

The Baumol-Willig rule ensures that a PEP who is entering into the wholesale electricity market is at least as efficient as PPC in the competitive sector of power production. It also ensures that PPC and PEP compete at the same level. This occurs because each firm deals with the same access price for the transmission system, provided that the opportunity cost for the access is interpreted correctly.

Although the above two stages procedure will actually reflect the way that access prices will be fixed in practice, this approach is based on optimising only production efficiency. Hence, the question that emerges is why we do not apply a procedure for determining both prices, namely the access price and the final price at the exit of the transmission system in order to maximise total welfare, that is the sum of the production and distribution efficiency. Since PPC should operate with fair returns, would it be desirable to have higher access prices for the transmission system, in order to be able to set lower power supply prices? The question, in other words, is to what extent it would be worth to sacrifice some of the production efficiency in order to achieve more distribution efficiency.

Specifically, the above analysis suggests that a PEP will receive a 'net' price per kWh equal to m = (p – x), and consequently will choose to supply that quantity of power, for which his marginal cost of supply will be **m**. Production efficiency will be achieved when **m** is set equal to PPC's marginal cost. This analysis however overlooks the fact that an increase of the access price **x**, over (p – m) could make possible a decrease of the final price **p** which is offered to a supplier at the exit of the transmission system. In this case, the optimal rule could be a combination of the final price **p** and the access price **x** which would lead PPC to operate at the level of achieving fair returns. PPC's profits increase with an increase either of **p** or **x** (through the ISO's payments to PPC as owner of the system). Therefore, PPC could operate with fair returns by increasing the access price **x** and simultaneously by decreasing the final price **p**. Since the Regulator is interested to improve the final consumer's welfare, it will certainly take into account this trade off relation. This fact will lead to the setting of the access price at a higher level than the one specified by the Baumol-Willig rule.

4. Alternative Pricing Rules

In this paper we compare the Baumol-Willig rule with two alternative rules for determining access prices to the interconnected system that is the Ramsey and the accounting rules.

According to the Ramsey Pricing Rule, the level at which the access price should be set in order to maximize total welfare depends on one hand on the elasticity of demand which determines the increase of consumer benefits resulting from the decrease of the final price at the exit of the transmission system and on the other hand, on the elasticity of supply which determines the decrease of the production efficiency resulting from the increase of the access price for using the transmission system. These conditions reflect the optimal solution of the more general problem of maximising the total welfare of power consumers, subject to the constraint that PPC operates in the context of fair returns. This optimal solution has as a result the determination of prices, known as Ramsey prices. These prices exceed marginal costs in such a way as to minimise distribution inefficiencies.

It is interesting to note that even though the Ramsey approach to access pricing is attractive in theory since it leads to more efficient prices, it is rarely favoured by the Regulator. This fact could be mainly attributed to the following reasons: Firstly, the Regulator's requirement for transparency regarding costs could not contribute significantly in the determination of Ramsey prices, and secondly, substantial amount of information is required in addition which is not usually available. For example power supply and demand elasticities are very difficult to estimate. Because of these difficulties the Regulator in practice adopts the Baumol-Willig rule.

On the other hand, the accounting pricing method for the determination of access prices for the transmission system and of selling prices at the exit points of this system are set equal to the corresponding unit costs, as these costs are estimated by allocating to the generation and transmission activities all direct and indirect cost elements. The allocation of the indirect costs is based on various rules as for example output quantities, value added, profit shares, quantities of direct cost, etc. More specifically, access pricing for the power transmission system could be set as equal to the unit cost of providing access plus a mark-up for fixed and other overhand costs.

Economists traditionally have criticised the use of accounting methods to determine prices, since these prices are not based on any principle of efficient allocation of resources. Therefore, it is interesting to examine the reasons that explain the attractiveness and popularity of these pricing methods for calculating prices for the use of the interconnected transmission system. The first reason is that these methods because of their simplicity and familiarity satisfy the public opinion concerning what is equitable for setting access prices. The second reason is the difficulty to determine in practice, even in a second best framework, optimal access prices for the use of the transmission system.

5. Conclusion

The above analysis showed that access prices based on Ramsey rule are closer to efficiency prices since their deviation from marginal costs depend on the elasticity coefficients of the supply and demand functions. However, their estimation in practice is very difficult because the required information is not usually available. They may not be popular to the public also, since consumers with inelastic demand will be asked to pay higher prices than those with elastic demands.

On the other hand, access prices based on accounting rules are simple to understand and popular since they satisfy the public opinion as to what is equitable and cover total costs. However, these prices based on accounting principles do not reflect efficiency prices corresponding to the maximisation of the consumers welfare function.

Finally, the Baumol-Willig rule in determining access prices for the use of the transmission system is widely accepted. For this one reason is that it is based on maximising production efficiency, which ensures the operation of a fair competition in the power production. The other reason is that this rule is easy to apply while the resulting prices are simple to understand and their application lead to covering total costs.

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THE RATE OF PROFIT IN THE GREEK ECONOMY 1988-1997. AN INPUT–OUTPUT ANALYSIS[*]

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Abstract

The evolution of the rate of profit reflects both changes in income distribution and technical conditions of production. The purpose of this paper is to present estimates of the rate of profit for the Greek economy using input-output data spanning the period 1988-1997 and, at the same time, to decompose the evolution of the rate of profit to its constituent components. These estimations are carried out in terms of (i) market prices; (ii) labor values; and (iii) prices of production.

JEL classification: C67, D30, D57.

Keywords: Rate of profit, profit–wage ratio, productivity of labor and capital, input–output analysis.

1. Introduction

The rate of profit is the most important variable of an economy for it regulates the rhythm of capital accumulation and the growth rate. The rate of profit can be decomposed into two other important economic variables, the profit-wage ratio and capital productivity. The profit-wage ratio is inversely related to the share of wages in the net product, which is equivalent to saying that the profit-wage ratio depends inversely on money

wage and directly on labor productivity, whereas capital productivity is inversely related to capital intensity. Consequently, the evolution of the rate of profit reflects both the changes in income distribution as well as the technical conditions of production. This paper presents estimates of the rate of profit of the Greek economy using input-output data spanning the period 1988-1997 and, at the same time, decomposes the evolution of the rate of profit to its constituent components. These estimations are carried out in terms of (i) market prices; (ii) labor values; and (iii) prices of production.

The remainder of the paper is organized as follows: Section 2 describes the way in which the decomposition model is applied to the available input-output tables[1]. Section 3 presents and critically evaluates the results of the analysis. Finally, Section 4 concludes and makes some remarks about future research efforts.

2. The Analytic Framework

We begin with by assuming a linear model of production where n commodities are being produced by n single-product sectors. We further suppose that homogeneous labor is the only primary input and there is only circulating capital. Labor is not an input to the household sector. The net product is distributed to profits and wages which are paid in the beginning of the common production period and there are no savings out of this income. All commodities are "basic" *à la* Sraffa (1960, §6) and there are no alternative techniques. The system is productive, *i.e.*, the Perron-Frobenius (henceforth P-F) eigenvalue of the matrix of input-output coefficients, $\mathbf{A}$, is less than one. Finally, the givens in our analysis are (i) the technical conditions of production, that is the pair [$\mathbf{A}$, $\mathbf{a}$], where $\mathbf{a}$ is the *1xn* vector of direct labor coefficients; (ii) the real wage rate, which is represented by the *nx1* vector $\mathbf{b}$; (iii) the gross output, which is represented by the *nx1* vector $\mathbf{X}$; and (iv) the market prices of produced commodities, which are represented by the *1xn* vector $\mathbf{p}$.

From the above it follows that the vector of the net product, $\mathbf{Y}$, equals $\mathbf{X} - \mathbf{A}\mathbf{X}$, and the total quantity of employed labor, L, equals $\mathbf{a}\mathbf{X}$. In addition, the profit-wage ratio, Π, and the rate of profit, r, of the system can be estimated in terms

of (i) market prices; (ii) quantities of "embodied" labor, *i.e.*, labor values; and (iii) prices of production. As a consequence, we have:[2]

(i) Total profits, P, equal $\mathbf{p}\mathbf{Y} - wL$, whereas total money wage, W, equal wL, where $w(= \mathbf{p}\mathbf{d})$ is the money wage rate. Thus, we may write

$$\Pi \equiv P/W = (\mathbf{p}\mathbf{Y} - wL)/wL = (\pi_L/w) - 1 \qquad (1)$$

where π_L ($\equiv \mathbf{p}\mathbf{Y}/L$) is the labor productivity. From equation (1) it follows that Π is a strictly increasing function of π_L and a strictly decreasing function of w. More specifically, we have:

$$\Delta\Pi > (<)0 \Leftrightarrow \hat{\pi}_L > (<)\hat{w} \qquad (2)$$

where Δx symbolizes the period to period change in a variable x, and $\hat{x} \equiv \Delta x/x$. The rate of profit in a circulating capital model is written as follows:

$$r \equiv P/(K+W) = \Pi/[(K/\mathbf{p}\mathbf{Y})(\mathbf{p}\mathbf{Y}/W) + 1] = \Pi/\{[(1+\Pi)/\pi_K] + 1\} \quad (3)$$

where K (or $\mathbf{p}\mathbf{A}\mathbf{X}$ in matrix terms) represents the money value of the means of production, and $\pi_K(\equiv \mathbf{p}\mathbf{Y}/K)$ is the net product-capital ratio or the capital productivity. Finally, K/W is the capital-wages ratio, which can be further written as $(1+\Pi)/\pi_K = k/w$, where $k(\equiv K/L = \pi_L/\pi_K)$ is the index of capital intensity. From (2) and (3) it follows that r is a strictly increasing function of π_L and π_K, and a strictly decreasing function of w.

(ii) The vector of labor values, $\mathbf{v}$, is determined by the system:

$$\mathbf{v} = \mathbf{v}\mathbf{A} + \mathbf{a} \qquad (4)$$

Consequently, $\mathbf{v} = \mathbf{a}\mathbf{B}$, where $\mathbf{B}(\equiv [\mathbf{I} - \mathbf{A}]^{-1})$ is the Leontief inverse. Given that $\mathbf{v}\mathbf{Y} = \mathbf{a}\mathbf{B}[\mathbf{I} - \mathbf{A}]\mathbf{X} = L$, it follows that $\pi_L = 1$ and $\Pi = (1/\mathbf{v}\mathbf{b}) - 1$. As a result Π, that now expresses the Marxian 'rate of surplus value', changes inversely with respect to the labor value of the real wage rate, $\mathbf{v}\mathbf{b}$, whereas the change in the latter can be split up as follows:

$$\Delta(\mathbf{v}\mathbf{b}) = (\Delta\mathbf{v})\mathbf{b} + \mathbf{v}(\Delta\mathbf{b}) + (\Delta\mathbf{v})(\Delta\mathbf{b}) \qquad (5)$$

and $\Delta\mathbf{v}$ can be further decomposed as

$$\Delta\mathbf{v} = (\Delta\mathbf{a})\mathbf{B} + \mathbf{a}(\Delta\mathbf{B}) + (\Delta\mathbf{a})(\Delta\mathbf{B}) \qquad (6)$$

Finally, the rate of profit expressed in terms of labor values is estimated from the following equation:

$$r = [(1/\mathbf{vb}) - 1]/[1/\mathbf{vb})(\mathbf{vAX}/L) + 1] \tag{7}$$

where $L/\mathbf{vAX}$ is the capital productivity in terms of labor values, and $\mathbf{vAX}/\mathbf{vb}L$ is the capital-wages ratio in terms of labor values or the Marxian "value composition of capital".

(iii) Prices of production, $\mathbf{p}^*$, and the rate of profit are estimated from the following eigenequation:

$$\mathbf{p}^* = \mathbf{p}^*\mathbf{C}(1 + r) \tag{8}$$

where $\mathbf{C}(\equiv \mathbf{A} + \mathbf{ba})$ is the nxn matrix of the "augmented" input-output coefficients, *i.e.*, each coefficient represents the sum of the respective material and wage good input per unit of output, and r is now the uniform rate of profit. Consequently, $\mathbf{p}^*$ is the left hand side P-F eigenvector of the matrix $\mathbf{C}$, and

$$r = \lambda^{-1} - 1 \tag{9}$$

where λ is the P-F eigenvalue of $\mathbf{C}$. Finally, relations (1) and (3) hold in terms of prices of production, whereas r can be expressed in terms of the rate of surplus value as follows: Let $\mathbf{q}^*$ be the right hand P–F eigenvector of $\mathbf{C}$, that is, $\lambda\mathbf{q}^* = \mathbf{Cq}^*$. Pre-multiplying the last relation by the row vector $\mathbf{v}$, and by invoking (9), gives

$$r = [(1/\mathbf{vb}) - 1]/[(1/\mathbf{vb})(\mathbf{vAq}^*/\mathbf{aq}^*) + 1] \tag{10}$$

where $\mathbf{aq}^*/\mathbf{vAq}^*$ is the capital productivity (in terms of labor values) in the system that produces $\mathbf{q}^*$ as gross output, known as Charasoff's "Standard system", and $\mathbf{vAq}^*/\mathbf{vbaq}^*$ is the value composition of capital in the same system.[3]

3. Results and their Evaluation

The results from the application of the relations (1)–(10) to the input-output tables of the Greek economy during the period 1988-1997 are displayed in Tables 1 through 4.

Table 1 gives the evolution of the money wage rate, labor productivity, profit-wage ratio, capital productivity, capital intensity, capital-wages ratio and rate of profit in terms of market prices.

Table 1: *Fundamental variables in terms of market prices.*

Years	w	π_L	Π	π_K	k	k/w	r
1988	0.872	1.474	0.690	1.100	1.340	1.537	0.272
1989	1.104	1.881	0.704	1.105	1.703	1.542	0.277
1990	1.144	1.944	0.699	1.107	1.756	1.536	0.276
1991	1.553	2.791	0.797	1.168	2.390	1.539	0.314
1992	1.560	3.035	0.946	1.183	2.566	1.645	0.358
1993	1.654	2.864	0.732	1.316	2.177	1.316	0.316
1994	2.015	3.676	0.824	1.252	2.936	1.457	0.335
1995	2.127	3.740	0.758	1.245	3.005	1.413	0.314
1996	2.316	4.077	0.760	1.264	3.225	1.392	0.318
1997	2.172	3.854	0.774	1.314	2.934	1.351	0.330

On the basis of Table 1 we derive the following conclusions: (i) The profit-wage ratio follows a rather upwards trend, which is relatively stronger in the sub-period 1988-1992, and weaker in the sub-period 1993-1997. In fact, we tried to fit the following trend line $y = \alpha + b\ell nt$ in the profit-wage ratio data of Table 1, and the OLS results for the period 1988-1997 gave us $\alpha = 0.700$, $b = 0.046$, *c.c.* = 0.439, where *c.c.* is the "correlation coefficient". When we tried the same regression for the two sub-periods, we got $\alpha = 0.643$, $b = 0.130$, *c.c.* = 0.760 for the sub-period 1988-1992, whereas we got $\alpha = 0.758$, $b = 0.012$, *c.c.* = 0.217 for the sub-period 1993–1997.[4] The profit-wage ratio falls in the years 1990, 1993 and 1995, whereas it rises in the remaining years. In the years 1990 and 1995 we observe that the money wage rate, w, increases together with the labor productivity, π_L, whereas in the year 1993 the increase in w is associated with a decrease in π_L. With the exception of the year 1997, where w decreases, every increase in Π is associated with an increase in w and π_L. (ii) With the exception of the year 1993, k moves in tandem with w. (iii) The rate of profit always moves in the same direction with the profit-wage ratio. However, the rate of profit does not always move in the same direction with the capital productivity or in the opposite direction to the capital-wages ratio.

Table 2 gives the evolution of the profit-wage ratio, capital productivity, capital-wages ratio and rate of profit in terms of labor values.

Table 2: *Fundamental variables in terms of labor values.*

Years	Π	π_K	k/w	r
1988	0.573	0.922	1.707	0.212
1989	0.598	0.934	1.711	0.220
1990	0.587	0.911	1.741	0.214
1991	0.649	0.965	1.709	0.240
1992	0.718	0.940	1.829	0.254
1993	0.588	1.052	1.511	0.234
1994	0.639	0.982	1.669	0.239
1995	0.584	1.020	1.553	0.229
1996	0.616	1.052	1.536	0.243
1997	0.611	1.047	1.538	0.241

On the basis of Table 2 we derive the following conclusions: (i) The profit-wage ratio follows a rather upwards trend, which is relatively stronger in the sub-period 1988-1992 and weaker in the sub–period 1993–1997. The OLS regression $y = \alpha + b\ell nt$ gives $\alpha = 0.592$, $b = 0.016$, *c.c. = 0.272*, (for the period 1988–1997), $\alpha = 0.552$, $b = 0.076$, *c.c. = 0.812* (1988–1992), and $\alpha = 0.600$, $b = 0.008$, *c.c. = 0.227* (1993–1997). The profit-wage ratio falls in the years 1990, 1993, 1995 and 1997, whereas it rises in the remaining years. The sources of these changes can be determined on the basis of the results derived from equations (5) and (6), and are displayed in Table 3. Thus, the rise in the profit-wage ratio in the years 1989, 1991, 1992 and 1996 comes from the positive effect attributed to **a**, **B**, which more than compensates the negative effect that is caused by the changes in **b**. The rise in the profit-wage ratio in the year 1994 comes from the change in **a**, which negates the negative effects that are exerted from the changes in **b** and **B**. Thus, we come to the conclusion that every rise in Π is connected to $\mathbf{v}(\Delta\mathbf{b}) > 0$. On the other hand, the fall in the year 1990 is attributed to the change in **b**. The fall in the year 1993 is attributed to the changes in **b** and **a**. As for the fall in the year 1995, we observe that this is attributed to the changes in **b** and **B**. Finally, the fall in 1997 is attributed to the changes in **b** and **B**.[5] (ii) The money wage rate $w(=\mathbf{v}\mathbf{b} = 1/(1 + \Pi))$ moves in tandem with $k(=1/\pi_K)$ during the sub-periods 1989–1991 and 1996–1997. (iii) The rate of profit always moves in the same direction with the profit-wage ratio. However,

the rate of profit does not always move in the same direction with the capital productivity or in the opposite direction to the value composition of capital.

Table 3: *Decomposition of the profit-wage ratio in terms of labor values.*

Years	$\Delta(vb)$	$(\Delta v)b$	$v(\Delta b)$	$(\Delta v)(\Delta b)$	$(\Delta a)Bb$	$a(\Delta B)b$	$(\Delta a)(\Delta B)b$
1989	−0.010	−0.138	0.164	−0.036	−0.135	−0.003	0.0001
1990	0.004	−0.016	0.020	−0.0002	−0.010	−0.007	0.0010
1991	−0.023	−0.185	0.227	−0.065	−0.178	−0.010	0.0030
1992	−0.024	−0.029	0.006	−0.001	−0.007	−0.022	0.0002
1993	0.047	0.022	0.028	−0.002	0.026	−0.004	−0.0005
1994	−0.020	−0.125	0.129	−0.024	−0.126	0.00005	0.0008
1995	0.021	−0.021	0.045	−0.003	−0.044	0.026	−0.0030
1996	−0.013	−0.061	0.054	−0.006	−0.046	−0.015	−0.0001
1997	0.002	0.064	-0.052	−0.010	0.055	0.007	0.0020

Table 4 gives the evolution of the money wage rate, labor productivity, profit-wage ratio, productivity of capital, capital intensity, capital-wages ratio and rate of profit in terms of prices of production. In the same Table, in the last two columns, we also show the capital productivity, in terms of labor values, and the value composition of capital, respectively, in Charasoff's "Standard system".

On the basis of Table 4 we derive the following conclusions: (i) The profit-wage ratio follows a rather upwards trend, which is relatively stronger in the sub-period 1988–1992, and weaker in the sub-period 1993-1997. The OLS regression $y = \alpha + b\ell nt$ gives $\alpha = 0.590$, $b = 0.024$, c.c. $= 0.293$ (1988–1997), $\alpha = 0.537$, $b = 0.101$, c.c. $= 0.801$ (1988–1992), and $\alpha = 0.612$, $b = 0.004$, c.c. $= 0.0779$ (1993–1997). The profit-wage ratio falls in the years 1990, 1993, 1995 and 1997, whereas for the remaining years it rises together with its constituent components w and π_L. In the years 1990 and 1995 we observe an increase in w and π_L, in 1993 the increase in w is associated with a decrease in π_L, whereas in 1997 we observe a decrease in w and π_L. (ii) With the exception of the year 1993, k moves in tandem with w. (iii) The rate of profit always moves in the same direction with the profit-wage ratio, the rate of surplus value (see Table 2) and, with the exception of the year 1990, the capital

productivity in Charasoff's "Standard system". However, the rate of profit does not always move in the same direction with the capital productivity of the economy or in the opposite direction to the capital-wages ratio of the economy and the value composition of capital in Charasoff's "Standard system".

Table 4: *Fundamental variables in terms of prices of production.*

Years	w	π_L	Π	π_K	k	k/w	r	aq^*/vAq^*	$vAq^*/vbaq^*$
1988	0.826	1.294	0.566	0.933	1.387	1.679	0.212	0.920	1.710
1989	1.050	1.673	0.593	0.945	1.770	1.686	0.221	0.937	1.706
1990	1.087	1.730	0.592	0.929	1.863	1.714	0.218	0.939	1.691
1991	1.503	2.485	0.653	0.982	2.530	1.683	0.244	0.989	1.667
1992	1.550	2.738	0.766	0.991	2.763	1.782	0.275	1.069	1.607
1993	1.609	2.555	0.588	1.067	2.396	1.489	0.236	1.067	1.488
1994	1.915	3.204	0.673	1.014	3.161	1.651	0.254	1.081	1.516
1995	2.063	3.273	0.586	1.024	3.196	1.549	0.230	1.030	1.538
1996	2.243	3.642	0.624	1.066	3.419	1.525	0.247	1.082	1.494
1997	2.045	3.292	0.610	1.036	3.178	1.554	0.239	1.033	1.560

Finally, from Tables 1, 2 and 4 we derive that, with the exception of the year 1997, the three profit-wage ratios and the three rates of profit move together (see also Table 5, which gives the correlation coefficients of linear regressions between the profit-wage ratio and the rate of profit evaluated in different price systems; superscripts 1, 2 and 3 refer to market prices, labor values and prices of production, respectively).

Table 5: *Correlation coefficients.*

	Π^1	Π^2	Π^3	r^1	r^2	r^3
Π^1	–					
Π^2	0.951	–				
Π^3	0.964	0.988	–			
r^1	0.895			–		
r^2		0.802		0.952	–	
r^3		0.907	0.923	0.941	0.949	–

4. Concluding Remarks

   It has been shown that, regardless of the way in which the profit-wage ratio and the rate of profit are being evaluated in the Greek economy during the period 1988–1997, the two variables under question move in tandem and they follow rather rising trends, which are relatively stronger in the sub-period 1988–1992, and weaker in the sub-period 1993–1997. However, the rate of profit evaluated in different price systems does not always move together with the corresponding capital productivity or inversely to the corresponding capital-wages ratio. With the exception of the year 1997, the profit-wage ratio always moves in the same direction. Finally, the money wage rate moves together with the capital intensity (especially when they are evaluated in terms of market prices and prices of production).
   Our results show that the rate of profit and the profit-wage ratio are robust to the type of price system used for their evaluation. These findings should not come as a surprise since in a study of ours we have found that the vectors of labor values and prices of production of the Greek economy are close to the vector of market prices.[6] Nevertheless these phenomena need further investigation, whereas a more reliable estimation of the evolution of the income distribution and the technical conditions of production requires data on (i) fixed capital; (ii) non-competitive imports;[7] (iii) turnover times; and (iv) sectoral rates of capacity utilization.

NOTES

1. See the Appendix A for the available input-output data.
2. For a detailed presentation see Fujimori (1982, ch. 1) and Kurz and Salvadori (1995, chs. 4 and 13).
3. For the details of this system, see, e.g., Kurz and Salvadori (1995, pp. 387–90). It is important to point out that from the relations (8)-(10) we get:
$$r^{-1} = \lambda(1 - \lambda)^{-1} = \mathbf{p}^*\mathbf{CX}/\mathbf{p}^*\mathbf{U} = \mathbf{p}\mathbf{Cq}^*/\mathbf{pU}^*$$

where $\mathbf{U} \equiv [\mathbf{I} - \mathbf{C}]\mathbf{X}$ is the vector of surplus product in the economy and $\mathbf{U}^* \equiv [\mathbf{I} - \mathbf{C}]\mathbf{q}^*$ is the vector of surplus product in Charasoff's "Standard system". It has been argued that r^{-1} can be viewed as a rather reliable indicator of the aggregate intensity of the demand for intermediate products (means of production and wage goods), which is independent from both relative prices of commodities and the composition of the surplus product and reflects therefore only the structural characteristics of the productive system (Marengo, 1992).

4. It may be noted that we tried, for the period 1988–1997, other trend lines such as $y = \alpha + bt$ or In $y = \ell n \alpha + bt$, which gave us lower correlation coefficients (this is also true for the other evaluations of the profit-wage ratio which are estimated below).

5. The available input-output tables are expressed in monetary terms, whereas the price indices for the individual commodities are not available. Consequently, the results of Table 3 must be taken with extreme caution. It is important to stress that the severity of the problem becomes more pronounced the more the *relative* market prices change over time.

6. See the Appendix B.

7. In this case we have more complications in the determination of the labor values. See Steedman and Metcalfe (1981, pp. 140–1), Okishio and Nakatani (1985, pp. 62–3), Steedman (2003, pp. 6–14).

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APPENDIX A: Data and their Sources

The symmetric input-output tables of the Greek economy are available for the years 1988 through 1998, and they are provided at the 25x25 sector detail. However, we do not have the necessary data on employment and wage for the year 1998, and so our analysis extends until the year 1997. From the 25 sectors only the first 19 are consistent with the requirements of our analysis: the concepts of labor values and prices of production have no meaning in sectors such as public administration and education, whereas the concept of output is problematic to sectors such as finance and real estate. Thus, we decided to eliminate from our analysis the last 6 sectors making the necessary adjustments in the output vector (the 25 sectors of the Greek economy and their correspondence to NACE is reported in Table A1 below).

In the available input-output tables we do not have data on the matrix of fixed capital coefficients and the non-competitive imports. As a result, our investigation is based on a model of circulating capital and we cannot treat the foreign sector of the economy separate from the domestic.

The market prices of all sectors are taken to be equal to one, that is to say, the physical unit of measurement of the output of each sector is that unit which is worth of a monetary unit. The vector of prices of production, $\mathbf{p}^*$, is normalized according to the equation $\mathbf{p}^*\mathbf{Q} = \mathbf{V}\mathbf{Q}$, where $\mathbf{Q} \equiv \mathbf{q}(\mathbf{V}\mathbf{X}/\mathbf{V}\mathbf{q})$, $\mathbf{V} \equiv \mathbf{v}(\mathbf{e}\mathbf{X}/\mathbf{v}\mathbf{X})$, $\mathbf{q}$ is the right-hand P-F eigenvector of the matrix of input-output coefficients, $\mathbf{A}$, *i.e.*, Sraffa's (1960, chs 4–5) "Standard commodity", $\mathbf{v}$ is the vector of labor values, $\mathbf{e}$ is the vector whose elements are equal to one and, therefore, represents the vector of market prices, and $\mathbf{X}$ is the vector of gross output. In particular this normalization ensures the following equalities $\mathbf{p}^*\mathbf{Q} = \mathbf{V}\mathbf{Q} = \mathbf{V}\mathbf{X} = \mathbf{e}\mathbf{X}$ (see also Shaikh, 1998).

In our estimation of employment we also accounted for the self-employed. Wage differentials were used to homogenize the sectoral employment (see, e.g., Sraffa, 1960, §10, and Kurz and Salvadori, 1995, pp. 322–5), that is the j element of the vector of inputs in direct homogeneous labor $\mathbf{a}$ is determined as follows: $a_j = (L_j/X_j)(w_j/w_{min})$, where L_j, X_j, w_j are total employment, gross output and money wage rate of the j sector, respectively, whereas w_{min} is the minimum sectoral wage rate. Finally, by assuming that workers consumption has the same composition as the vector of the private households consumption expenditures, $\mathbf{c}$, directly

available in the input-output tables, the vector of the real wage rate, **b**, is determined as follows: $\mathbf{b} = (w_{min}/\mathbf{ec})\mathbf{c}$ (see, e.g., Okishio and Nakatani, 1985, and Ochoa, 1989).

Table A1: *Correspondence of the input-output tables to the NACE (REV.1).*

IOT(25)	NACE	Nomenclature
1	01–02	Agriculture, Hunting and related service activities, Products of Forestry: logging related services
2	5	Fish and other Fishing products
3	10–12	Mining of coal and lignite; Extraction of peat, extraction of crude oil and natural gas, mining of nuclear materials
4	13–14	Mining of metal ores, other mining and quarrying products
5	15–16	Manufacture of food products and beverages, tobacco products
6	17–19	Manufacture of textiles, manufacture of clothes process and Dyeing of fur, manufacture of tanning and dressing of leather
7	20	Wood and wood products
8	21–22	Pulp, paper and paper products publishing printing and reproduction of recorded media
9	23	Manufacture of coke: refined petroleum products and nuclear fuel
10	24–25	Manufacture of chemicals and chemical products, manufacture of rubber and plastic products
11	26	Manufacture of other non-metallic mineral products
12	27	Basic metals and fabricated metal products
13	28	Fabricated metal products except machinery and Equipment
14	29–37	Machinery and equipment, office machinery and computers, electrical machinery and apparatus, radio, television and communication equipment and apparatus, medical precision and optical instruments, Watches and clocks, motor vehicles trailers and semi-trailers
15	40–41	Electricity, gas, steam and hot water, collection purification and distribution of water
16	45	Construction Work
17	50–52	Whole sale and retail sale of motor vehicles, whole sale and retail sale except vehicles and retail trade
18	55	Hotel and Restaurant Services
19	60-64	Transports, water transport services, air transport services, post and telecommunications
20	65–67	Financial intermediation services, insurance and pension funding services, Services auxiliary to financial intermediation
21	70–74	Real estate services, renting services of machinery and equipment, computer and related services, Research and development services, other business services
22	75&90	Public administration and defense services, Sewage and refuse disposal services sanitation
23	80–85	Membership organization services n.e.c.
24	91	Membership organization services n.e.c.
25	92,93,95 & 99	Recreational, cultural and sporting services, other services n.e.c, domestic services

Source: *Mylonas et al. (2000), pp. 70–2.*

APPENDIX B: Deviations of Prices of Production from Market Prices and Labor Values

In Table B1 we report the deviations of the vector of prices of production from the vectors of market prices and labor values as these are estimated on the basis of MAD (Mean Absolute Deviation) and the '*d* statistic'. The advantage of the *d* statistic over the MAD is its independence of the normalization condition. Consider the deviation of vector $\mathbf{x} \equiv [x_j]$ from vector $\mathbf{y} \equiv [y_j]$, where $j = 1, 2, …, n$. The MAD of the two vectors is defined as

$$\text{MAD} \equiv (1/n) \sum_{j=1}^{n} \left| (x_j/y_j) - 1 \right|$$

whereas the *d* statistic, which has been proposed by Steedman and Tomkins (1998), is defined as

$$d \equiv \sqrt{2(1 - \cos\theta)}$$

where θ is the angle between the vector $[x_1/y_1, x_2/y_2, …, x_n/y_n]$ and the unit vector.

According to the two measures of deviation we realize that (i) in general terms the deviations are in the range of 20%; (ii) the deviations of prices of production from the labor values are much smaller than those of prices of production from market prices; and (iii) the deviations of prices of production from market prices are the largest in the year 1997, the only year that the profit-wage ratio and the rate of profit estimated in both prices of production and labor values do not move in the same direction with the profit-wage ratio and the rate of profit estimated in market prices.

Table B1: *Statistics of deviations of prices of production, labor values and market prices.*

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	
Prices of Production vs. Market Prices	0.178	0.174	0.205	0.200	0.196	0.220	0.231	0.208	0.204	0.250	*MAD*
	0.228	0.219	0.235	0.227	0.219	0.208	0.242	0.251	0.228	0.287	*d*
Prices of Production vs. Labor values	0.075	0.082	0.076	0.084	0.083	0.064	0.080	0.075	0.074	0.093	*MAD*
	0.093	0.098	0.090	0.100	0.097	0.079	0.089	0.090	0.089	0.094	*d*

Source: *Tsoulfidis and Mariolis (2006).*

PRIVATE INVESTMENTS THROUGH THE MARSHALL PLAN AND THE CONTRIBUTION TO THE DEVELOPMENT OF GREEK CAPITALISM

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Abstract

In the present paper, we recapitulate briefly the role of the Marshall Plan for the economic development of Greece in general. Next, we step into a quantitative analysis of that part of the Plan, which passed directly to the private sector of the economy. In specific, we discuss the sectoral distribution of the provided loans and we study the role of commercial banks and how these affect the viability of the businesses. By manifesting the distorted implementation of a specific strategy, the erroneous management, cases of petty politics and cliental relationships, the paper concludes on the consequences of that restricted part of the Marshall Plan, and it provides relevant proposals for further research regarding the post-war development of Greek Capitalism.

1. Introduction

Since the creation of the Greek State, national economy leant upon lending and economic support from other developed countries. The repeated foreign borrowing and aid, irrespective of its title and content[1], determined largely the economy's contemporary path. The abetted economic balance classifies the country's economy as one belonging to the periphery of international modern capitalism. Undoubtedly, this continuous foreign aid, which indicates a dependent economic development, does not represent any exclusivity. However, Greece asserts exclusivity in the argumentation that arises each time in order to justify the "lost opportunities"! Going through the history of foreign borrowing and

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aid in general, a parameter emerges always (whether the civil war, or the administrative weaknesses, or even monetary instabilities etc), which can be blamed for the modification of the initial action plan and thereby the vitiation of its effects. Consequently, from all different objectives or quantitative targets set by a program for foreign aid, there is almost not a single one that has been fully achieved. This specific parameter, permanent scapegoat for the economic misery, the unfulfilled promises and the unresolved problems, becomes thereinafter an additional argument for the improved settlement of the borrowing conditions and sometimes for the negotiation of new external funding. Nevertheless, the repeated use of this parameter in question raises some doubts, the most important of which is its very validity.

Searching for an answer regarding the above query was the main reason for focusing on Marshall Plan, the well-known post-war US European Recovery Program, from which Greece received significant support.

2. The Marshall Plan

2nd World War destroyed the national economies of European countries, winners or losers. According to the view of many of the researchers at that time, the specific socioeconomic situation was very much suitable for the spreading of communism. Therefore, US support to Europe is taken for a preventive measure against the endangerment of American interests.

In the European Recovery Program, announced by General Marshall in the University of Harvard in June of 1947, there is no direct statement regarding the danger from the East. However, in his speech, which represented actually the content of the program itself, he related the economic support for the economic reconstruction of the European countries and the improvement of the European economy with political stability and peace[2]! There was a precondition for that support: European countries had first to accept the program and further to agree among them for the total amount of funds that would be necessary, which meant the drawing up of a common economic program. Many of the later researchers considered this precondition as the origin of the idea for a united Europe.

This prima facie bountiful action met a direct response from the academic

and scientific field regarding its socioeconomic and ideological-political dimensions, which resulted in addressing the extent and the significance of US support for the economic reconstruction of Europe and its return to the path of capitalistic economy. Nonetheless, it would be particularly naive or unduly idealistic to consider the economic support from Marshall Plan as a "giving" without "taking". Therefore, Marshall Plan is described as an "exquisite act of strategic generosity" (*Le monde, 9 juine 1997*). That is, an act through which European economy recovers and develops, strengthening at the same time the leading position of US economy in the international scene. American dominance evolves especially through the spreading of the American paradigm in a part of the European continent that binds politically, economically and ideologically to the US. Consequently, American economic aid contributed to the reconstruction of those European economies that responded to the initial call, it granted them their independency (…sic), but it set at the same time an uneven relationship of interdependence to the donating country.

2.1. The Marshall Plan in Greece

Greece was one of the 16 European countries that responded to the call of US for an economic support. According to the plan, provision of economic support presupposed the design of an economic program of reconstruction, which had to be submitted by the receiving country to the *Organization for European Economic Cooperation* (OEEC). This program, designed by the *Supreme Council of Greece's Reconstruction*, was the first systematic attempt for a medium-term economic planning (Bank of Greece, 1978, p. 350). Basic idea of the program was the synergy among the different sectors of the economy and their interconnections. Therefore, the schedule foresaw a balanced distribution of the fund among the different branches (Stathakis, 2004, p. 272f).

In order to fulfill the program and the required investments, Greece requested an aid of 1.187 millions US$ for the period 1948/49–1952/53. It received finally the amount of 946,4 million US$, which corresponds to 7,1% of the total American aid obtained by the European countries. According to Angelos Angelopoulos, Greece received relative to its population the highest amount than any other country, and the sum of US

funds was higher than the total of all foreign loans given to the country from 1821 to 1930 (Kazakos, 2001, p. 94).

These comparative valuations of the size of the American aid give evidence for the extremely high amount of money provided, relative to the dimensions of the Greek economy, which did not however yield the expected benefits. Although the justifications for this partial success (or partial failure) that appear in the related literature vary, still they converge to this parameter-excuse that we mentioned earlier. In our effort to study objectively this argumentation, we used a part of the archival material referring to the "financial assistance in the forms of credits" (FEK 31/1/1949) that concerned private investments, which is in other words the archive of the *Central Loan Committee* (CLC) itself[3].

2.2. The Central Loan Committee – CLC (**KED**)

Following the Agreement for Economic Cooperation between the governments of Greece and the U.S. (2nd of July 1948), the ECA Mission (*Economic Cooperation Administration*) and the Greek Government signed on the 12th of November 1948 an Agreement regarding the *Agricultural and Industrial Loans.* It concerns that part of the Marshall Plan, which had the scope of supporting private enterprises by providing loans that originated from the funds for reconstruction. For that purpose, three accounts were opened at the Bank of Greece: *Greek State– Drachma Loan Account, Greek State–Dollar and Drawing Rights Account and Greek State – Sterling Account.*

For the needs of managing this sub-program, according to the 2nd Article of the Agreement, a representative from the Greek Government and one from the Bank of Greece, a member representing the ECA Mission and one member – chosen by vote– from the participating commercial banks constituted the Central Loan Committee. The task of CLC was the examination of the loan applications, forwarded by the authorized participating banks, the approval or the rejection of them according to the criteria of the Agreement[5], as well as the administration of the loans as foreseen in the agreements signed by the Greek Government and AMAG in March and May of the same year.

Commercial banks were providing mortgage, dollar denominated loans,

without their caution and with an interest rate that was supposed, according to the underlying agreement, not to be higher than 8%. Commercial banks had also the right to charge a rate of 2% as a fee for their services. Duration of the loans was not supposed to exceed the period of 12 years[6]. Those clauses of the agreement for commercial banks' intervention manifest clearly the wish of supporting the bank sector. Notice further that the main interest for commercial banks lies not only in receiving the 2% rate. The management of significant funds itself and the development of a list of customers-investors was also of considerable importance.

CLC approved, in the time from its foundation (1948) till its abolition (1954), 717 loans summing up to the amount of 85.050.289 US$. However, till the end of June 1954 the allowed money was only 80.842.502 US$[7]. Almost the whole of this amount, 77.853.660 US$, came out from ECA Mission (Marshall Plan), while the rest, 2.988.842 US$, resulted from AMAG funds (Truman Doctrine). Given the total financial support provided to Greece by Marshall Plan (946,4 million US$), the part that has been used for strengthening the private sector was minimal coming up to just 8,25%, which means that for the realization of the economic program of reconstruction an extraordinary emphasis was given to the public sector.

In the meantime, by the end of 1953, the charged interests and installments for paying off the debt came up to 24.431.129 US$ in the aggregate, from which only 15.568.909 US$ have been actually collected till the end of June 1954. The remained obligations (8.862.221 US$) consisted of 3.092.575 US$ interests and 5.796.646 $ mature capital. At the same time, which is the date of CLC abolition, 336 cases paid at least 40% of their outstanding liabilities, 140 cases paid back less than 40% (10-20%) and finally there were 146 cases characterized as "precarious", as they did not return any part of the overdue debts at all (see an unbounded report with the title "Position of KED's Loans on the 30th of June 1954")[8]. For the cases that returned at least some part of the outstanding liabilities, CLC provided several facilitating regulations, nevertheless without having any influential result, according to the above mentioned report.

As we have already stated, in July of 1954 CLC did not exist anymore, and the reasons that have been declared for its abolition were its inefficiency and the unsuccessfully, with respect to the program for reconstruction, applied credit policy. According to V. Kyriakopoulos, general manager of the

National Bank of Greece during that time, there are two figures that reveal the results of CLC's credit policy (Association of Employees of National Bank of Greece, 1957, p. 11–12):

➢ First, during the economic year of 1953–54, CLC collected only 3.891.497 US$ amortizations, against the amount of 8.470.500 US$ that it should receive.

➢ Second, by the 28th of February 1954 the sum of unpaid amortizations from loans of the ECA Mission and AMAG came up to 13.439.645,41 US$.

A special agreement, signed immediately after CLC's abolition, constituted the Organization for Financing of Economic Development (OXOA). OXOA's central aim was to lend industrial investments and other private enterprises with the funds from the collected amortizations of CLC's loans, as well as with funds coming from other sources (mostly from the State but also with 10 millions US$ from MSA, the authority that replaced ECA Mission after the completion of Marshall Plan). In other words, OXOA was supposed to apply credit policy, partly on the basis of the liabilities to CLC's. Therefore, OXOA's accounting reports, titled as *General Recapitulations*, represent in fact the course of CLC's loans. In the following, we proceed to our empirical analysis, based on the *General Recapitulation* of 1958-1959.

3. Quantitative Analysis of the Course of CLC Loans

CLC managed, as already mentioned, about 81 millions US$ on the purpose of reconstructing the private sector[10]. From the study of the figures given in the *General Recapitulation* of 1958–1959 it seems that Greece shared during the post-war period the socioeconomic afflictions of international capitalism's developing periphery. The undeniably significant funds of Marshall Plan have been distributed differently than it was foreseen in the initial program, while especially those that have been used for supporting private, non-state enterprises suffered from unsystematic management providing therefore poor results.

3.1. Plan and Reality

Table 1 gives the distribution of the loans by sector and/or by commercial bank that was in charge of. Further, it depicts the development of paying off the accumulated debts by the end of 1958, again by sector and/or by commercial bank. In the first part of the table, one can see that more than 52% of the funds have been directed to the industry. Following, 14% of the total amount of money were loans that financed private investments in the agricultural sector and in common wealth[11]. Even smaller is the participation of private / non-state investments in transportation with 6% of the overall funds. A special category is the one of the so-called "factories that suffered damages by the bandits". What is meant, are those industries that were supposed to suffer damages during the Greek civil war after the end of the 2nd World Ward. This category accounts for more than 5% of the overall funding! Finally, minor is the part of the funds that were directed towards private / non-state investments in the mine industry, in fishery and in tourism.

In comparison to the actual distribution of funds, it is interesting to take a closer look on the content of the program under the title *Provisional Long-term Program for the Economic Recovery of Greece / 1948–1952*. The program was constituted, as already mentioned, by the *Supreme Council of Greece's Reconstruction* as ordered by the Government in August 1948, submitted in November of the same year to the Organization for European Economic Cooperation (OEEC) in Paris.

This long-term program for economic recovery, which by the way has been widely assessed as a very well-aimed and well–documented one (Stathakis, 2004, p. 272), foresaw a total fund of 1.187 million US$ that should derive out of the German and Italian restore payments, domestic national savings and foreign capitals, meaning mainly funds from the US aid. The program emphasized in industrialization and electrification, while it foresaw also land reclamations works and transport projects of a wider extent, investments for the reconstruction of fishery and tourism, as well as expenditures for housing, water supply, public health and education. As a quantitative target, the program predicted that by the end of the following period industrial production should be more than double compared to the one previous to the 2nd World War and the corresponding increase of agricultural production should be about 20%. Similar, the deficit in the Balance of Payments should show a significant reduction (Bank of Greece, 1978, p. 403).

Nevertheless, reality was much different by the end of 1952: industrial production exceeded that of 1938 by only 25%. The relevant report for the first 50years of the Bank of Greece gives the following reason when it tries to justify the failure in achieving the initial goals: the inability of securing the foreseen funds both, from external as well as from the internal sources. Still, the question remains: does this reasoning correspond to reality or not? The truth seems to be quite different, as the sum of foreign funds that flowed in the country alone through Marshall Plan reached according to an estimation the amount of 946,4 million US\$ (Mirkos, 2004, p. 67). Beside the fact that it is considered to be one of the most significant inflows of capital relative to the dimensions of the domestic economy, it makes almost 80% of the forecasted amount of money.

Was it perhaps the dissimilarities among the actual distribution of funds and the scheduled one that caused this failure in completing the program of economic reconstruction? As the above mentioned intersectoral division of capitals that supported private, non-state investments (loans of CLC) shows, there is an obvious, significantly higher funding of industry[12], which is in agreement with the basic intention of the *Supreme Council* for the country's industrialization. On the other side, the total amount of money managed by CLC made of course a very small part of the funds that received Greece in the frame of the Marshall Plan (almost 8,25% according to the above estimation). Consequently, an important aspect that could have hindered the accomplishment of the goals is the fact that, although the interesectoral distribution of money that supported private initiatives was consistent with the initial plan, private sector received in total an especially small part compared to the public sector and the governmental expenses. In addition, this argument becomes even more important, as a significant part of the resources spent by the state concerned consumption expenditures (like financing governmental deficits and purchase of armament), instead of productive public investments and infrastructure improvements.

3.2. Inefficiency and Unreliable Management

Working out the data from *General Recapitulation* of 1958–1959 brought into light another factor that played an important role in the development

of the productive investments: the money that was given for loans of businesses and private initiatives have not been managed by the most efficient way. In particular, in the aforementioned report of V. Kyriakopoulos (1957) there is a wider critic against CLC's credit policy, which is based, among other things, on the fact that CLC assigned the right of intervening to almost all the commercial banks in an irresponsible and improper way. The first part of **table 1** confirms the argument of Kyriakopoulos, as 58% of the resources flows to the investors through the Bank of Land, followed by the National Bank of Greece that managed over 23% of the loans[13]. Besides, there is only Agricultural Bank that seems to specialize in managing files of businesses that correspond to its specific character. All the rest maintain a list of customers with all different kinds of economic activities without any logical relation to the specialization of each institution.

Table 1: Distribution of the CLL & AMAG loans by sector and/or by commercial bank and Paying off till 31/12/1958.

RELATIVE DISTRIBUTION OF LOANS BY SECTOR AND/OR BY COMMERCIAL BANK

	Fishery	Agriculture	Industry	"Industry with damages"	Common Wealth	Transport	Mines	Tourism	LOANS by BANK
Agricultural Bank	97,8%	66,3%	-	-	-	-	-	-	12,2%
Bank of Land	-	3,3%	69,0%	-	92,1%	47,5%	86,9%	21,7%	55,7%
National Bank	1,3%	18,7%	25,1%	76,0%	6,9%	6,4%	11,3%	78,3%	23,1%
Ionian Bank	0,7%	7,8%	0,9%	-	1,0%	-	1,8%	-	1,8%
Popular Bank	0,2%	0,8%	1,9%	24,0%	-	-	-	-	2,3%
Commercial Bank	-	3,2%	2,7%	-	0,1%	46,1%	-	-	4,7%
Bank of Credit	-	-	0,4%	-	-	-	-	-	0,2%
LOANS by SECTOR	2,8%	14,3%	52,1%	5,1%	14,0%	6,1%	3,4%	2,1%	

% CHARGED INTERESTS OVER THE WITHDRAWN CAPITAL (PROVIDED LOAN) BY THE 31/12/1958

	Fishery	Agriculture	Industry	"Industry with damages"	Common Wealth	Transport	Mines	Tourism	LOANS by BANK
Agricultural Bank	30,0%	30,4%	-	-	-	-	-	-	30,3%
Bank of Land	-	39,7%	40,6%	-	40,7%	31,9%	31,7%	42,9%	39,7%
National Bank	31,2%	41,5%	39,4%	31,9%	31,5%	13,5%	37,8%	36,2%	37,3%
Ionian Bank	30,5%	41,0%	41,6%	-	28,1%	-	19,1%	-	39,2%
Popular Bank	23,2%	33,8%	49,0%	22,2%	-	-	-	-	34,0%
Commercial Bank	-	39,2%	35,2%	-	31,7%	2,1%	-	-	15,8%
Bank of Credit	-	-	42,6%	-	-	-	-	-	42,6%
LOANS by SECTOR	30,0%	33,9%	40,3%	29,5%	40,0%	17,0%	32,2%	37,7%	

% CHARGED EXPENSES OVER THE WITHDRAWN CAPITAL (PROVIDED LOAN)

	Fishery	Agriculture	Industry	"Industry with damages"	Common Wealth	Transport	Mines	Tourism	LOANS by BANK
Agricultural Bank	4,5%	0,7%	-	-	-	-	-	-	1,5%
Bank of Land	-	2,0%	0,1%	-	0,0%	0,0%	0,2%	2,5%	0,1%
National Bank	0,1%	0,8%	0,6%	1,6%	0,6%	0,0%	0,0%	0,0%	0,7%
Ionian Bank	0,0%	6,4%	1,2%	-	0,0%	-	1,1%	-	4,3%
Popular Bank	2,1%	0,3%	0,3%	3,0%	-	-	-	-	1,7%
Commercial Bank	-	2,2%	1,5%	-	7,4%	0,5%	-	-	1,0%
Bank of Credit	-	-	0,0%	-	-	-	-	-	0,0%
LOANS by SECTOR	**4,4%**	**1,2%**	**0,3%**	**1,9%**	**0,1%**	**0,3%**	**0,2%**	**0,6%**	

% OVERDUE DEBT OVER THE SUM OF CHARGES (INCLUDED THE INITIAL CAPITAL) BY THE 31/12/1958

	Fishery	Agriculture	Industry	"Industry with damages"	Common Wealth	Transport	Mines	Tourism	LOANS by BANK
Agricultural Bank	61,8%	75,7%	-	-	-	-	-	-	72,5%
Bank of Land	-	53,1%	51,7%	-	61,8%	69,7%	55,0%	94,2%	55,5%
National Bank	45,8%	70,5%	63,1%	85,0%	82,5%	0,0%	82,7%	64,4%	67,9%
Ionian Bank	29,1%	85,3%	58,3%	-	36,2%	-	96,9%	-	74,6%
Popular Bank	77,4%	72,9%	67,2%	98,3%	-	-	-	-	82,7%
Commercial Bank	-	77,7%	80,4%	-	92,9%	99,4%	-	-	90,1%
Bank of Credit	-	-	54,4%	-	-	-	-	-	54,4%
LOANS by SECTOR	**61,3%**	**74,7%**	**55,7%**	**88,1%**	**62,9%**	**77,3%**	**58,9%**	**71,2%**	

In order to approach this issue quantitatively we proceeded with six different analyses of variance (ANOVA) trying to detect the statistical significance of the differences in characteristic key indicators that appear among sectors and/or banks. The indicators are the following (you can see the respective average values in table 1):

➢ Percentage of totally charged interests (by the 31/12/1958) over the initially withdrawn capital (provided loan),

➢ Percentage of charged expenses over the withdrawn capital (provided loan) and

➢ Percentage of overdue debt over the sum of charges (included the initial capital) by the 31/12/1958

The results of ANOVA provide evidence for significant differences both, among the sectors as well as from bank to bank[14]. Loans that were given for industrial investments and for tourism show an especially high percentage of charged interests compared to the initially withdrawn capital, while the opposite is true for investment in transport sector. On the other hand, the Bank of Land and the Ionian Bank charged interests that made on average almost 40% of the initial given loan, whereas the analogue figure for Commercial Bank is slightly higher than 15%. Sectoral differences show an indirect, but important, divergence from the priorities of the Program for Economic Recovery, while the significantly higher percentage of charged interests in case of the Bank of Land demonstrate the consequences from a disproportionate and inconsiderate distribution of management among banks.

The picture arising in case of the second indicator is similar. Ionian Bank is here the "champion", main because it charged agricultural investments with expenses that came up to the excessive percentage of almost 6,5%! Analogue is the problem faced by the related sector of fishery: Agricultural Bank, the main manager of funds that flowed in this economic activity, charged expenses of 4,5% on average.

Finally, statistically significant differences appear also in the third indicator, which relates the remained debt to the overall sum of charges, including the initially provided capital. It gives thereby a picture of the investments' viability on the one hand and of the efficiency of the whole program on the other. Investments in the industry, in mines, in common

wealth and in fishery demonstrate the lowest percentages of overdue debt, which could be for someone an indication for the correctness of the initial planning. On the contrary, the so-called "industrialists that suffered damages by the bandits" manage to return barely 10% of their debts! Regarding the banks, Commercial and Popular Bank appear to have by far the highest percentage of overdue debts (more than 90% and 80% respectively), while Bank of Land is the more efficient one in that matter as it gets back almost 45% of total charges.

The above discussed analyses of variance illustrate the differences in specific characteristics of the development path of private investments that have been supported by the Marshall Plan. Yet, this method is unable to provide an overall picture with a simultaneous consideration of various parameters at the same time. Therefore, we proceeded further with a regression of the overdue debt percentage (dependent variable) against the following explanatory variables:

➢ seven different dummy-variables, which account for the seven different sectors of economic activity (omitted variable the sector "fishery"),

➢ accordingly, six different dummy-variables, which account for the different commercial banks being in charge for the management of the loan (omitted variable the Agricultural Bank of Greece),

➢ the amount of the initially provided loan,

➢ the percentage of totally charged interests (by the 31/12/1958) over the initially withdrawn capital (provided loan) and finally

➢ the percentage of charged expenses over the withdrawn capital (provided loan).

As we detected heteroscedasticity (usual for the case of regressions with cross-section data), we applied a linear least square regression with the White-correction[15]. **Table 2** presents the results. In general, F-statistic confirms the validity of the specification, although the adjusted R^2 is low, mainly in case of the estimation without a constant term. However, an adjusted R^2 of 0,14 in the first regression that considers the constant term is noteworthy, especially when we are dealing with a cross-section analysis[16].

Regarding the concrete findings, we can focus on the following interesting aspects:

➢ For projects that concern the so-called "industrialists that suffered damages by the bandits" or the sector of common wealth (mainly non-governmental power-energy investments and infrastructure in general) we find an enormously higher percentage of overdue debt that exceeds the average by 19 and 16% respectively. In addition, in case of the estimation without a constant term we observe a significantly higher degree of unpaid debts for all the different sectors except for industry. (Notice that the omitted sector fishery is used as the benchmark against which we compare all other sectors). Thereafter, one can deduce that investments in industrial production and in fishery appear to be more efficient in paying back their debts.

➢ The role of the Bank of Land is of similar statistical importance: for projects that have been managed by this institution the degree of overdue debt is significantly lower by almost 10%, other things equal. This conclusion emerges particularly in the estimation without a constant term. However, even when we do consider a constant term the statistical significance of the estimation is such that we can hardly ignore.

➢ Further, we should not overlook the role of the amount of the provided loan. Although t-statistic in the present regression is slightly lower than what we would need, the positive estimated coefficient lead us to an interesting discussion: perhaps we have some first evidence for the fact that in case of larger investment project there are greater obstacles in maintaining their viability. This could be easily related to the endogenous difficulties that arise traditionally in the developing economies of the periphery of international capitalism, showing at the same time the deficiency of the Greek state, CLC and related institutions in supporting appropriately projects of a greater extent.

➢ Finally, the negative effect resulting, ceteris paribus, out of the percentage of totally charged interests and expenses is of notably importance. An increase of one percentage point of extra charges leads to roughly an additional percent of remained debts!

Table 2: Regression of overdue debt by 31/12/1958

	Estimation with a constant term		Estimation without a constant term	
Observations: **745**				
Dependent Variable: **Percentage of overdue debt by the 31/12/1958**				
	Estimation	t-statistic (absolute value)	Estimation	t-statistic (absolute value)
Constant	26,61	5,62**	–	–
Agricultural Activities	1,11	0,42	6,24	2,39*
Industry	0,03	0,01	3,22	0,73
Factories that suffered damages by the bandits	19,28	3,25**	26,37	4,22**
Common Wealth	16,29	2,45**	23,63	3,41**
Transport	25,84	1,08	45,44	1,72*
Mines	11,78	1,28	21,31	2,30*
Tourism	5,74	1,00	11,12	1,94*
Bank of Land	-8,54	1,59 (!)	-13,02	2,31*
National Bank of Greece	2,36	0,73	-0,11	0,03
Ionian Bank	-5,93	1,06	-7,22	1,26
Popular Bank	4,37	0,62	2,41	0,29
Commercial Bank	6,48	1,13	7,83	1,34
Bank of Credit	–2,98	0,25	–8,83	0,87
Provided Loan	3,59 E-06	1,44 (!)	3,06 E-06	1,21
% of totally charged interests over the provided loan	0,75	5,49**	1,43	25,17**
% of charged expenses over the provided loan	1,38	6,75**	1,62	6,70**
Regression Statistics:				
R^2	0,159		0,091	
R^2 adjusted	0,141		0,072	
F statistic	8,930		4,861	
Prob (F statistic)	0,000**		0,000**	

When we consider the whole of the above quantitative ascertainments together, we come undoubtedly to the conclusion that the inefficient and unfounded management of the funds that flowed in the private sector,

despite the fact that they were not sufficiently high, contributed also to the failure to achieve the initial goals.

4. Epilog

The constantly repeated use of the apologetic parameter, adjusted accordingly to each historical period in order to give a justification for the endogenous weaknesses, provides a very characteristic and often successful alternative policy for countries in the periphery of international capitalism. Yet, this does not mean that it responds to reality. In the present paper we tried to reveal the real reasons behind the excuses, especially for the post-war period of Greek capitalism, by focusing our quantitative analysis on the funds of Marshall Plan that have been used to finance private / non-state productive investments.

The failure of the initial goals of the *Program for the Economic Recovery of Greece* arises because of two main causes: **on the one hand**, the fact that private sector absorbed a relatively small part of the inflowing funds, whereas a significant fraction of the resources spent by the state concerned consumptive expenditures (like financing governmental deficits and purchase of armament), instead of productive public investments and infrastructure improvements. **On the other**, even this limited amount of money, which was given for private / non-state productive activities, has been the subject of an inefficient and unfounded management. In that way, it contributed to the reduction of the viability and the competitiveness of the undertaken investments.

The present paper and especially the part of the quantitative analysis enables us to set some further questions related to the reasons that lie behind the variability of the percentage of overdue debt for each project. In addition to the variables that have been used in the present version of the survey, we strongly believe that a more detailed study of the content of the 717 different files (one for each loan) will give us additional information for the exact economic activity in each investment project, other characteristic figures of each firm, as well as the complete cross-time pay-back of the loan. We are convinced that this information will increase the ability of our approach in explaining objectively the failures of the postwar recovery procedure in Greece.

NOTES

1. Title and content of foreign help varies from time to time and from case to case. Hence, it arises as foreign borrowing, taking afterwards the form of economic support, shifting into programs of reconstruction and lately programs of convergence.

2. Among the various reprints of Marshall's speech in Harvard, there is one translated in Greek, published in Mirkos, 2004, p. 121ff.

3. In point of the archive of CLC (known as KED in the Greek literature), in our days part of the historic archive of the Cultural Foundation of Piraeus Group of Companies (PIOP), see among others in Elli Kravariti, 2002, "The Historic Archive of ETBA", in Records of Industrial History, Proceedings of the 3rd Panhellenic Scientific Meeting, Ermoupoli 20-22 October 2000, TICCIH – Hellenic Department, Athens, p. 154-161. In particular, the archive of CLC is assorted in three series: First, the one with the Proceedings of the Board of Directors of CLC, in which one can find also the Monthly Report of Transactions consisting of 306 files in 29 boxes (KED 1.1 till 1.29); second the series of loans that consists of almost 600 files in 228 boxes (KED 2.1 till 2.228) and finally the series of loan account sheets in 4 boxes. The assortment of the archive, as well as the creation of an index for the whole of this valuable material, is still under implementation.

4. Participating commercial banks have been approved by the Currency Committee and they have signed an agreement with the Greek Government regarding the conditions of their participation in the lending procedure. These banks were the following: National Bank, Agricultural Bank, National Bank of Land, Bank of Athens, Greek-Egyptian Bank (excluded in 1952), Commercial Bank (excluded in 1952 subsequent to an accusation), Commercial Bank of Credit (excluded in 1952), Ionian Bank, Bank Karavasili (excluded in 1952), Popular Bank and Bank of Piraeus (excluded in 1952).

5. The criteria were the following: a)The Laws of Greece, b)The terms and the conditions of the Agreement, c)The general credit directives of the Greek Government, d)The Policies of the Greek Recovery Program and e)The specific loan policies and directives of the Central Loan Committee.

6. It should be noticed that many of the conditions of the first agreement changed in later periods–see for instance FEK 09/08/1954. Consequently, loans' duration, interest rates etc. are changing continuously in the forthcoming years.

7. In fact, these amounts should be used with some caution. For instance, other sources mention that the funds that allowed by CLC for private investments were 79.498.632,57 US$. See in The Banking Issue and OXOA (Association of Employees of National Bank of Greece), 1957, p. 21.

8. The exact numbers in this report should be used with some cautiousness too. Nevertheless, they give a clear picture of the overall position of the loans.

9. This replacement was not a neutral one; it meant also the change of the character of US aid, as the later have been modified from an economic support to a mainly military one.

10. It is worth mentioning that this is the first attempt ever of taking a closer look and analyzing quantitatively the data of the archive of CLC's loans.

11. Thereby we mean the private non-state investments of the energy sector, as well as other investments related with public goods and the economy's infrastructure.

12. If we add the categories of "factories that suffered damages by the bandits" and mines, the percentage comes up to almost 60% of the given loans.

13. There were also other institutions that came up with analogue censure: Association of Employees of National Bank of Greece (1957) criticized CLC for the uneven distribution of loans among the different participating commercial banks. The specific condemnation from employees of the specific bank results of course to a great extent out of the competition among the banks.

14. See for more details in the appendix. The differences (without the statistical significance) appear also in the second, third and forth part of table 1.

15. We note also the fact that there are only insignificant degrees of correlations among the independent variables, which confirms the absence of multicolinearity.

16. Besides, the purpose of the present approach is not to explain the entire variability of the dependent variable, but to evaluate jointly the effect of parameters that we can measure and document in the frame of this study.

17. The fact that the estimated coefficient is very low (3,59 E-06) makes sense, as the dependent variable is percentage and the amount of loan is measured in US$.

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APPENDIX 1

Table A.1: Descriptive Statistics and ANOVA for the Amount of each Loan (in US$) by Branch and by Rank

APPENDIX 2

Table A.2: Descriptive Statistics and ANOVA for the % of the charged Interest over the loaned Capital by Branch and by Bank

	N	Mean		Sum of Squares	df	Significance
1) Fishing	248	26.4128	Between Groups	11799	7	F: 17.682
2) Agriculture	232	32.2488				Sig:.000
3) Industry	178	36.3751	Within Groups	70775	737	
4) Civil War industry	26	30.1388				
5) Common Wealth	23	32.3868	Total	82574	744	
6) Transport	4	14.7899				
7) Mines	19	31.2437				
8) Tourism	15	26.0240				
TOTAL	745	32.3926				

ANOVA

|	N	Mean		Sum of Squares	df	Significance
1) ATE	388	29.1792	Between Groups	9680	6	F: 16.640
2) Ktimatiki	95	28.3383				Sig:.000
3) ETE	197	35.4429	Within Groups	72725	739	
4) Ionini	30	33.5560				
5) Laiki	14	36.8764	Total	82575	744	
6) Emporiki	29	29.8214				
7) Emp. Pisteos	2	43.0500				
TOTAL	745	32.3026				

APPENDIX 3

Table A.3: Descriptive Statistics and ANOVA for the % of the charged Expenses over the loaned Capital by Branch and by Bank

	N	Mean	ANOVA					N	Mean	ANOVA		
				Sum of Squares	df	Significance					Sum of Squares	df	Significance
1) Fishing	245	3.0849	Between Groups	1286	7	F: 8.644	1) ATE	358	2.1509	Between Groups	2610	6	F: 1.891
2) Agriculture	232	.8574				Sig.: .000	2) Kilmatiki	35	.6011				Sig.: .081
3) Industry	178	.8883	Within Groups	15692	737		3) ETE	187	1.4292	Within Groups	16906	738	
4) Civil War Industry	26	6.6465	Total	17117	744		4) Ioiosi	30	2.8367	Total	17117	744	
5) Common Wealth	23	1.0174					5) Laiki	14	1.4579				
6) Transport	4	.1875					6) Emporiki	23	1.6360				
7) Mines	19	.4325					7) Enp. Plakeon	2	.0000				
8) Tourism	15	.2347											
TOTAL	745	1.7563					TOTAL	745	1.7563				

APPENDIX 4

Table A.4: Descriptive Statistics and ANOVA for the % of the open Debt over all the charged Debits (31/12/1958) by Branch and by Bank

	N	Mean		ANOVA Sum of Squares	df	Significance
1) Fishing	248	52.1	Between Groups	22691	7	F: 3.846
2) Agriculture	232	53.4				
3) Industry	178	55.9	Within Groups	605203	737	Sig.: .000
4) Civil War Industry	26	78.4				
5) Common Wealth	23	69.4	Total	627994	744	
6) Transport	4	65.6				
7) Mines	19	55.0				
8) Tourism	15	60.8				
TOTAL	745	56.2				

	N	Mean		ANOVA Sum of Squares	df	Significance
1) ATE	388	51.9	Between Groups	15463	6	F: 3.104
2) Ktimatiki	95	52.9				
3) ETE	187	62.3	Within Groups	612480	738	Sig.: .005
4) Ionini	36	53.3				
5) Laiki	14	61.0	Total	627994	744	
6) Emporiki	29	60.0				
7) Enp. Pistaos	2	56.1				
TOTAL	745	53.2				