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## Economic Management of Minoan and Mycenaean States and Their Development

### 1. *Introduction*

During the second millennium BC, there appeared in the Aegean what are considered to be the first civilizations on the European continent, namely the Minoan (from 1900 BC) on the island of Crete and then the Mycenaean (from 1600 BC), on mainland Greece (Peloponnese) and Crete. Even though they were distinct, both civilizations were closely linked, as is clearly exemplified for instance, by their respective writing systems (Linear A and Linear B). Nevertheless, they both find their roots in civilizations that appeared earlier in the Near East (including Anatolia) and Egypt (Nakassis *et al.* 2010). The Minoan civilization emerged earlier (around 1900 BC) than the Mycenaean one and lasted until 1400 BC after which it disappeared and was included in the Mycenaean world.<sup>1</sup> Both civilizations suddenly collapsed around 1075/1050 BC and then disappeared, leading to a period called the «Dark Ages» in Greece and Crete.

Despite this rapid and irreversible collapse, the Aegean world was characterized by economic prosperity and social development during approximately one millennium, spanning from the Middle to the Late Bronze Age (Chadwick 1994; Blintiff 2004). Social development and economic growth are marked by several features: the growth of agricultural production (crop cultivation and animal husbandry) and of craft production (textile, pottery, metalworking...), an increase in the level of population, the building of monumental palaces (Knossos, Mycenae, Tiryns...), some with true Cyclopean masonry, as well as monumental burials (shaft graves in Mycenae, tholos tombs

in Messenia), roads and other public infrastructures and the development of arts (exemplified by the mortuary golden masks)<sup>2</sup>. Beyond these features, the most important ones are the existence of organization by the state and writing (Linear A of Minoan Crete and Linear B of Mycenaean Greece), both being considered to be the required features in order to talk about «civilization».

Therefore, and despite the claim of some economists (e.g. Clark 2007; Ashraf and Galor 2011), economic development did occur in Europe long before the Industrial Revolution, as exemplified by the Bronze Age Aegean civilizations. Given the previous assessment, the following question needs to be addressed: what were the main reasons for the long-term prosperity of Aegean civilizations?

While some bio-geographic conditions contributed to economic development in the Aegean, they were far from being ideal, compared to those in the Levant. Indeed, it seems that bio-geographic conditions were not very favorable to the success of the Bronze Age Aegean civilizations and the explanation for their success should be found somewhere else. It may have been that their stressful environment encouraged Aegean people to adopt an elaborate form of social and economic governance. In other words, we have to highlight the role of institutions<sup>3</sup> in order to explain why Aegean societies succeeded.

Both Minoan and Mycenaean states were relatively small, with territories of about 1,500 km<sup>2</sup> and central settlements of 20-100 ha. They coalesced and developed through exchange of goods and ideas, accompanied by competitive display and emulation between similarly structured emergent state systems (Nakassis *et al.* 2010). From an institutional point of view, the main feature of these societies is that they are «complex». According to Tainter (1988, p. 24), «Complexity is generally understood to refer to such things as the size of a society, the number and distinctiveness of its parts, the variety of specialized social roles that it incorporates, the number of distinct social personalities present, and the variety of mechanisms for organizing these into a coherent, functioning whole. Augmenting any of these dimensions increases the complexity of a society».

At the social level, in the Aegean – as well as for Bronze Age civilizations of other regions (Near-East, Egypt) – the extraction of the economic surplus contributed greatly to the stratification of the society between elites and

commoners, leading to the so-called «complex societies». In other words, the main condition for economic development in pre-modern societies<sup>4</sup> was the existence of social hierarchies, with the elite or rulers extracting the surplus from the output produced by the masses or commoners. Under these circumstances, the economic surplus was not dissipated by the growth of population, i.e. these societies were able to escape from the Malthusian trap (Svizzero and Tisdell 2014; Tisdell and Svizzero 2015a; 2015b). In the economic literature, it is often believed that economic growth and prosperity are associated with inclusive economic and political institutions, while extractive institutions typically lead to stagnation and poverty (Acemoglu and Robinson 2012). But this implies no extractive institutions can generate economic growth and overlooks the fact that not all extractive institutions are the same. Therefore, it is the aim of the present paper to study how the economic surplus was extracted and used by the elite, and how this fostered the economic development of Bronze Age Aegean civilizations.

## *2. The Aegean Bio-Ecological Conditions: Favorable but Not Decisive*

One possible explanation of early economic development is based on so-called «bio-geographical conditions». After Diamond (1997), many authors thought that these conditions were important, and even crucial, in explaining the development path of various countries, especially when the prehistoric period is considered. Such «bio-geographical» or «bio-ecological» conditions include features related to the climate (sun radiation, rainfall, temperature, wind...), the environment (soil, water), cultivars and animals suitable for domestication. In the Near-East as well as in Egypt, all these conditions were present or at least were rapidly met (with the spread of agro-pastoralism) and this is why the Neolithic revolution occurred there initially, about 10000 BC. It is well known that agro-pastoralism spread progressively eastward and westward from the Levant. In Europe, agriculture has spread in approximately 2,500 years, from South-East Europe (Thessaly, 6500 BC) to Scandinavia, Britain and Ireland (around 4000 BC). Thus, the Aegean area was one of the first European regions which shifted

to agro-pastoralism. According to this chronology, it might seem natural that the first European civilizations occurred in the Aegean. However, it is not obvious that it should be so. Indeed, in the Near-East as well as in Egypt, bio-ecological conditions were better than they were in the Aegean. In the latter, – Crete and mainland Greece, the Peloponnese – some of the bio-ecological conditions were favorable, but not all, and thus as a whole, they were not likely to be decisive for economic development.

On the one hand, some bio-ecological/environmental conditions in the Aegean could have been favorable to early economic development. Possibly, these included abundant fishery resources. Fish if dried or salted provides a storable food source. Most Aegean communities had easy access to the sea so they could easily make use of the sea for fishing as well as for trade. Moreover, it is noteworthy that many of the food products which these communities produced were storable, e.g. cereals, olive oil, wine, and thus were easy to trade.

On the other hand, many environmental conditions required for economic development – the latter being mainly based on agriculture – were not met in the Aegean. In the latter, for instance, there are neither a major river<sup>5</sup> nor a developed network of rivers and therefore irrigation for agriculture was (and still is) a major problem. In the Aegean rainfall was the essential source for plant growth, rather than the lakes, streams, and springs, and there were important inter-annual fluctuations in rainfall. As a consequence of the previous statement, agro-pastoral societies of southern Greece and Crete have had to develop dry farming in stony soils.<sup>6</sup> Furthermore, Mesopotamia and the Nile valley are plains, and thus are easy to be cultivated. On the contrary, in Crete and Peloponnese, the landscape is featured by hills and mountains and plains are very scarce. For instance, in the two main areas of the Peloponnese where the Mycenaean people were present – namely Argolid and Messenia – the mean slope is about 12% (Galaty *et al.* 2014). Thus, the Aegean people were confined within geographical boundaries (island, narrow plains) and were struggling under constraining ecological conditions, i.e. they were facing a stressful climate and soils with low-resilience. Therefore, their economic development was surely dependent on something other than bio-ecological conditions, and this is where institutions come in.

### *3. Mycenaean Institutions: A Centralized and Hierarchical Administrative and Social System*

The Mycenaean society was a generally stable and ordered one, with a very strict hierarchical system, very similar to a planned economy. A planned economy is an economic system in which decisions regarding production and investment are embodied in a plan formulated by a central authority, usually by a public body such as a government agency. Central planning aims to improve productivity and coordination by enabling planners to take advantage of better information. This is achieved through the consolidation of economic resources when making decisions regarding investment and the allocation of economic inputs such as labor and land.

This conception of the Mycenaean society emerges mainly from the archaeological evidence and more specifically from the Linear B tablets found at various Mycenaean sites (mainly in Pylos,<sup>7</sup> Messenia). The sociopolitical structure of Mycenaean states can be divided into three groups: the palatial elite, the regional elite, whose power only had provincial influence, and the lower classes (or commoners) which included farmers, craftspeople, workers and slaves. Authority was strongly centralized and although the palace did not control every aspect of life in every community, it could gather, if necessary, detailed information in any part of the territory that it controlled. Each Mycenaean state was headed by a king – called a Wanax – and beneath him came a very complex social and administrative organization which consisted of various officials charged with various duties.

In spite of separate and distinct origins for each palace center,<sup>8</sup> a striking uniformity evolved among them in crafts, administrative systems, and unifying institutions such as kingship, typically explained as the result of some form of peer polity interaction.

#### *3.1. The Socio-Administrative Organization*

The administrative hierarchy within Mycenaean states can be reconstructed as follows from Linear B records, especially those from Pylos. The king or Wanax was the head of a hierarchical system, and his position was

associated with the political, economic, military, and religious spheres to some extent.

A clear administrative hierarchy is evident from the Linear B tablets. Various administrators acted to oversee particular industries or to manage economic activities. Indeed, in a society like the Mycenaean one, the king needed a group of people who could act as his delegates and be his attendants. This must have been a class of aristocrats, maybe kin to the royal house, who acted as senior officers of the administrative system and could also form the elite troops of the army. Several administrative positions within Mycenaean states were decentralized, or partially decentralized, because the individuals holding these offices – usually called «collectors» – worked as liaisons between primary center authorities and outlying regional settlements. A second set of decentralized offices – called «korete» and «prokorete» – were involved in coordinating and managing exchanges between palatial authority and particular administrative regions (districts). Finally, at the village level within Mycenaean territories was a local chieftain called «basileus».

### *3.2. Linear B Clay Tablets: Writings for Economic and Administrative Purposes*

The elites of different Mycenaean states used similar bureaucratic tools, such as Linear B, and management techniques. Of the various means used by the palace to control the economy, the most innovative for that period was writing. It is possible to compare newly emerged alphabets of the past with previously existing ones, and to deduce from letter forms which existing ones served as models. For that reason, we can be sure that the Linear B<sup>9</sup> syllabary of Mycenaean Greece had been adapted by around 1400 BC from the Linear A<sup>10</sup> syllabary of Minoan Crete.

Evidence for bureaucratic control of commodities and production comes from clay tablets inscribed with Linear B text which have been found at the Mycenaean palatial centers at Pylos, Mycenae, Thebes, Tiryns and Knossos. All the Pylian Linear B records can be divided into five major types of transactions: mobilization of goods and services, agricultural production, personnel maintenance, distribution of offerings for cult purposes, and craft production. For

the most part, the tablets found contain inventories of raw materials and value-added goods, both presumably received and allocated by the palaces. One-third of all Linear B tablets from the palace of Knossos are accountants' records of sheep and wool, while an inordinate proportion of writing at the palace of Pylos consists of records of flax.

Linear B was inherently so ambiguous that it remained restricted to palace accounts, whose context and limited word choices made the interpretation clear. All of the Linear B texts found thus far have been strictly economic and administrative; no stories, no myths, no laws have been preserved in this particular script, and not a trace of its use for literature has survived. One can explain that the scope of the Linear B tablets is reduced because the clay tablets were only preserved unintentionally by an accidental fire and only record the final year, or perhaps an even smaller time frame of Mycenaean palace administration. With the fall of Mycenaean Greek civilization, around 1050 BC, Linear B disappeared, and Greece returned to an age of preliteracy.

#### 4. *Extraction (or Mobilization) of the Economic Surplus from Agriculture, Craft Production and Trade*

The extraction or mobilization of the economic surplus by the elite was possible at different levels of the resource flows associated with the production process, ranging from the inputs to the outputs and the consumption of the latter (Earle 2011).

The most important input required for production was land because the Mycenaean economy was mainly agricultural. In most ancient «advanced» economies, land was owned by the elite because it requires important prerequisite investments – such as forest clearance, terracing, irrigation system – before agricultural production becomes possible. Thus, the elite incurs these investments first and thereafter it extracts staple resources in return for access to the land by commoners. In the Mycenaean states, staple goods – mainly wool, flax, grain, oil – were often collected as tax-in-kind. However, due to the absence of an irrigation system and of equivalent prerequisite investments, land ownership was fragmented between local communities, sanctuaries and the palaces, the latter owning quite a small part of the land. Even if the amount of the taxes paid in



kind (staple resources) to the palace is not precisely known, we may surmise that its level should not be underestimated. Indeed, staples were used by the palace in order to support the palace guard, various workers building the palace and its facilities, the palace-retinue of crafters. Moreover, staples were also used by the palatial elite to support elaborate feasts and festivals associated with the palace and sanctuaries.

Besides land, labor is the main input in these economies. Although slavery was present, most people were not slaves, nor were they constrained by *corvée* labor.<sup>11</sup> In fact, labor was mobilized by the elite through a «task system» – called «*tarasija*»<sup>12</sup> – in which workers receive raw materials from the palace with the expectation that targets of production would be met.

Furthermore, the elite was involved in the production of luxury goods (jewelry, weaponry, textile, perfumed oil). The surplus or the added value associated with these craft productions was mobilized according to two different systems. Either staple rations were distributed directly by the elite to the attached specialists living at the palaces and working in palatial workshops, or to craftsmen – such as farmers and herders – involved in the *tarasija* system. It is also possible that, in both cases, land was provided to these specialists for their support (in addition to staple rations in the former case and craft production in the latter case).

In addition, Mycenaean states were important trading states. It is likely that the elite extracted some economic surplus by taxing traders. Given the importance of the sea in the Aegean world, those involved in maritime trade were easy targets for taxes. These taxes could have been on imports – especially prestige goods – as well as on exports. Since most – if not all – trade was carried on ships, the elite could have extracted payments from merchants for access to safe harbors and for the protection of shipping ways.

##### *5. The Distribution of the Economic Surplus: Staple and Wealth Finance Systems*

It is usually accepted that, in ancient economies, the discretionary economic surplus obtained from agriculture and available to the ruling class consisted of the remaining sum after allowing for defence, could be used for the following purposes:<sup>13</sup>

- Economic development, for example the building of infrastructure (for instance, irrigation works for agriculture, the road system<sup>14</sup>) and for advancing knowledge.

- Ostentatious and gluttonous consumption by the ruling class.

- For the conduct of war, as distinct from defence.

In the Mycenaean states, and due to the existence of a centralized and hierarchical administrative and social system implemented by the elite to mobilize the economic surplus at various levels, the uses of the economic surplus can also be viewed differently, i.e. as two channels of a distributive system. Both channels refer respectively to a staple finance system and to a wealth (or prestige) finance system. In fact, archaeological remains and the linear B texts lead archaeologists working on Minoan and Mycenaean states to envision the palaces as classic, Near Eastern-style redistributive centers that dominated the production, storage, and regional distribution of agricultural staples and wealth items. Staples and wealth obtained by mobilization would have been strategically distributed in ways that developed palatial sources of power. This, therefore, is an additional type of use made by the elite of the extracted economic surplus to those possibilities mentioned above.

### 5.1. *The Staple Finance System*

Staple finance is based on the intensification of a subsistence economy, where the state can require payments of common goods, often foodstuffs. Once collected these goods are often redistributed in order to support dependent labor, ritual and communal activities, and military exploits. Contrary to wealth finance, staple finance is primarily based on the redistribution of subsistence items to fund certain actions by the populace. However, to some extent, it can also be used to support the power of the elite.

### 5.2. *The Wealth Finance System*

As stated by Acemoglu and Robinson (2012, Chapter 3), a way by which economic growth under extractive political institutions can emerge is when elites can directly allocate resources to high productivity activities that they themselves control. The Late Bronze Age elites were concerned with

the control of markers of status and prestige. This became institutionalized in palatial control of the production and consumption of prestige goods. This often included control of raw materials (often imported) or the distribution of the finished goods (imported but produced most of the time) to selected consumers (Pullen 2013). Thus wealth finance is based on the control of high-status goods and relies on unequal social relationships and prestige goods to create and maintain elite identities. Under a wealth finance system, legitimization of power and prestige can be achieved through the strategy of gift-exchange.

The basis of Mycenaean wealth-finance was the production and distribution of prestige goods that could be used to affirm and negotiate social status. The political importance of wealth comes from its role as an essential way in which to validate social status, to obtain loyalty of regional warriors and to build alliances with other palaces. These pre-monetary economies thus created a networked strategy dependent on gift exchanges of wealth.

## 6. *Economic Structure and Palatial Control*

Mycenaean palaces can be characterized as powerful redistributive centers whose primary role was to extract labor and materials from a wide economic hinterland and thereby support production and distribution of specialized craft products.

### 6.1. *Cultivation and Rearing*

It is obvious that the Mycenaean economy was mainly based on agriculture. Agriculture was highly organized and this becomes apparent by the written records of deliveries of land produce, taxes in kind due to the palace. The tablets from both Pylos and Knossos demonstrate that there were two major food-grains produced; wheat and barley. Apart from cereals, the Mycenaean also produced wine, olive oil, oil from various spices and figs. It should be noted that many agricultural products were storable, and then could be used as a reserve of value or for long-distance trade. Animal rearing – mainly sheep and goat – was well developed and used for food production (meat, dairy product) and secondary products (wool, hide).

The palace had an interest in production of raw materials and monitored each stage of the process from land ownership up until a finished product was created from within the center by highly specialized craftspeople.

## 6.2. *The Textile Industry*

Like most of the other industries of the Mycenaean economy, the textile industry, especially at Knossos, was very centralized and planned. In the Argolid, there are clear written references to textile production only in Mycenae (Varias 2012). The textile industry was well developed, based on wool (from sheep) and flax (from linen), i.e. was closely linked with the agricultural sector. Since there is enough textual evidence about the textile industry, it is possible to present a tentative *chaîne opératoire* of textile production. It seems that no single person would create a textile from start to finish. Instead there would be a chain of production with a separate individual (or multi-person work group) in charge of completing each stage. This specialization of labor increased productivity and also solidified the palace's control over the labor force. In addition to this division of labor between individuals,<sup>15</sup> it is almost certain that various towns specialized in certain kinds of fabric (woolen textiles in Knossos, linen textiles in Pylos). Some wove the cloth and others provided the decorative ornaments. The tarasija system was also used in the textile industry. For instance, an individual was given permission to grow flax on a plot of land controlled by the palace in exchange for later payments in flax. However the palace would not provide raw materials from the center and expect finished goods in return; instead it would collect some raw materials (like flax, wool, and simple textiles) from the surrounding towns and produce finished or value-added products inside or near the palace. The distribution of staple resources was also possible; for instance, some herders were paid rations in figs and barley by the palace.

## 6.3. *Craft Production of Luxury Items*

The specialized crafts of Mycenaean Greece are well documented textually and archaeologically. Builders, potters, weavers, metallurgists, perfumers, and glassworkers all appear

in the Linear B texts, and the fruits of their labor have been recovered through archaeological excavations and surveys. The production, the internal circulation as well as the consumption of valuables were completely controlled by the palace. They were thus socially exclusive, politically loaded and ideologically significant (Voutsaki 2001; 2010). Craft specialization contributed to the highly focused political economies associated with Mycenaean palatial systems, which all eventually supported several full-time, specialized, attached craft industries. Prestige items were under direct palatial control and workshops were mostly located inside the citadel. Prestige items were often made of exotic and rare materials. They included for instance, items of dress, jewelry, perfume, weapons and vessels used on special occasions, food and drink (Voutsaki 2001, Table 1; 2010).

Apart from gold, silver and lead, bronze was the main metal for the making of tools, weapons and ornaments. Most of the tablets referring to bronze found in Pylos demonstrate a very tight control of the metal industry by the palace. Despite such tight control, bronze-smiths were mostly located at various locations throughout the kingdom and did not seem to be concentrated in the palace center. Each smith was allocated raw ore and other materials from the palace and assigned a «*tarasija*», or task, and then was expected to deliver the final product to the palace. A wheeled chariot industry was also present.

Perfumed oils and unguents were already produced in the third millennium BC in Egypt and Mesopotamia and the Linear B tablets found at Pylos, Mycenae and Knossos provide textual evidence for the creation of perfumes and unguents by these states. The creation of perfumed oil was controlled by the palaces in a similar manner to textiles. Scented oils were for local consumption, for civic and religious purposes, and also for export.

### *7. Regional and Interregional Trade*

Regional<sup>16</sup> and interregional<sup>17</sup> trade was of central importance in the Aegean economies (Cline 2007). Indeed, on the one hand it appears that the production of various agricultural, and in smaller scale «*industrial*» goods (such as the bronzes in Pylos), may well have exceeded local demand. The surplus could be exported (even if part of it

was stored for use if there was a bad harvest). On the other hand, many craft workshops under palatial control that were producing luxury items (jewelry, ornaments, metal vessels...) required raw materials (metals, ivory, glass...) that were not available in the Aegean and thus had to be imported. Some of these items were re-exported after they were increased in value by craftsmanship. Given both assessments, one may conclude that for the Aegean societies trade was a very important feature and we may even assume that it was vital. Trade was so important to the power and wealth of the Mycenaeans that they engaged in wars to crush their rivals. The most well-known of these wars was against the Phrygians of Troy.

As for the production of staples and luxury items, regional and interregional trade were under the strict control of the central authority. In other words, if any «private» initiative existed, it must have operated under the patronage and protection of the palatial system.

### 7.1. *Export-Oriented Production of Luxury Goods*

In order to maintain the competitiveness of trade in the foreign markets, the Mycenaeans proceeded with the systematic export of agricultural products. The main exported products were olive oil, scented oil and wine. Scented or perfumed oil – mainly made from olive oil – belonged to luxury items and was produced directly under the palatial control (Shelmerdine 1985); it was used locally and exported, the latter being confirmed by thousands of Aegean stirrup jars found outside the Aegean world. Timber is considered to have been exported to Egypt which was always in need of wood due to its total absence of forests.

Manufactured products (textile, pottery, metalworking) were also exported. The tablets found at the Mycenaean palaces disclose a special interest in the textile industry and we can conclude that most of the textiles listed, are not everyday goods, but special ones designed either for the palace or for export. Similarly, Mycenaean pottery and other artefacts are found as far as Cyprus, Egypt, the Levant, South Italy and Sicily. Indeed, tens of thousands of Mycenaean vessels found in excavations, from Sicily in the west to Jordan in the east, are powerful attestations

to various forms of interregional interaction involving the palatial Mycenaean civilization, the dominant power in the Aegean during the Late Bronze Age. Concerning metalworking, and especially bronze, Chadwick (1994, p. 141) argues that the total number of smiths in the Pylian kingdom was nearly 400. Such a large force of craftsmen must have been able to produce many tons of goods annually, far more than the domestic need. Therefore Pylos must have had a surplus of metal goods for export.

Finally, exchange was not restricted only to products; it frequently included the exchange of people. Mercenaries were sent on military operations for foreign countries and slaves from abroad were also «imported».

### *7.2. Import of Raw Materials*

The great number of imported vases in the grave circles of Mycenae shows that already from the early Mycenaean period the Mycenaeans had commercial exchange with countries of the East Mediterranean, Egypt and countries of the West. The reasons for such an unexpected and widespread development of trade lie in the strengthening of the central power and in the increased demand of metals which the Mycenaean leaders tried to reserve for foreign markets. Raw materials used in Mycenaean palatial workshops must have been imported, especially metals, ivory, semi-precious stones and materials (e.g. amber from the Baltic; Czebreszuk 2007). Gold must have been imported from Egypt. Copper was most probably imported from Cyprus. The search of tin, one of the most rare metals which was indispensable for the production of bronze made the Mycenaeans reach Spain, the Baltic and perhaps Afghanistan. All the ivory used in the Mycenaean palaces obviously came from abroad, perhaps Syria.

### *7.3. From Trade to Colonization?*

The Mycenaeans were active participants in eastern Mediterranean trade networks, from which the palaces obtained essential raw materials, particularly metals. As the palace economies expanded in search of reliable sources of supply, certain peripheral locations witnessed the Mycenaean

presence, ranging from sporadic visits to full-blown colonies. However the general question of Bronze Age Aegean emporia in the eastern and central Mediterranean is still open and controversial. Indeed, the form of Mycenaean presence can be interpreted in different ways: the material remains can indicate simple episodes of trade at multicultural emporia, or deeper cultural penetration in the form of emulation, merchants' enclaves, or even colonies of Mycenaean immigrants.

### 8. *Non-Palatial Sectors*

Growth under extractive political institutions may also arise when the institutions permit the development of somewhat, even if not completely, inclusive economic institutions (Acemoglu and Robinson 2012, Chapter 3). Many societies with extractive political institutions will shy away from inclusive economic institutions because of fear of creative destruction. But the degree to which the elite manage to monopolize power varies across societies. In some, the position of the elite could be sufficiently secure that they may permit some moves toward inclusive economic institutions when they are fairly certain that this will not threaten their political power. Such a situation can be clearly identified in Aegean economies.

Until recently it was believed that Minoan and Mycenaean economies were completely controlled by the elite and its administration, i.e. that they were «full palatial economies» (Chadwick 1994; Blintiff 2004). However, recent studies have shown that it was not true, i.e. that a non-palatial economy was present next to the palatial one (Sjöberg 1995; Tartaron 2008; 2010). Indeed, several scholars (Nakassis *et al.* 2010) have sought to break the monopoly of the palaces in the economic sphere by identifying palatial and non-palatial sectors, the latter referring to certain areas of agriculture and craft production in which the palaces may have shown little interest or exerted little control. Non-palatial sectors of the Mycenaean economy have usually been identified by their virtual absence of mention in the Linear B archives, particularly those involving non-luxury goods or from evidence that a particular activity was decentralized. For example, perfumed oil and bronze production were directly monitored by the palace, but the former was highly



centralized while the latter was decentralized (Shelmerdine 1985). The production of ceramics<sup>18</sup> was only indirectly monitored, and most aspects of chipped stone production were not controlled at all. Thus, we now understand that the palatial component of the economy coexisted and interacted with the non-palatial component, especially in economic realms such as agriculture,<sup>19</sup> ceramics, and chipped stone. However the existence *per se* as well as several other dimensions of the non-palatial sector remains unclear. For instance, were the economic activities of this sector subject to taxes? Concerning the existence of this sector, one may surmise that if they were not controlled, it was because these economic activities were not capable of producing a significant economic surplus. Except fine pottery (which require scarce raw material such as kaolinite), common potteries as well as chipped stones require raw materials (clay, flint) which are very abundant and thus the outputs of these industries are not very valuable. Furthermore, if they were not taxed, it was probably because the transaction costs were too high (e.g. monitoring the procurement of raw materials such as clay or flint) in relation to the tax which could be collected.

### 9. Conclusion

In the Aegean societies (Minoan and Mycenaean), the elite developed institutions resulting basically in a centralized and hierarchical administrative and social system devoted to the control of most parts of the economy, going far beyond the simple withdrawal of the economic surplus. Indeed, the central control of production and distribution of output in the economy played a key role in promoting trade, economic diversification and specialization. This added to the wealth of these states. In fact, the elite managed most of the economy as a central planner. It organized:

- the division of labor and the specialization in production (e.g. the cultivation of olive trees, sheep husbandry to get meat and wool...),
- the construction of buildings, infrastructures and facilities aimed to encourage production and trade (roads, harbors),
- the extraction or mobilization of the economic surplus from agricultural production, craft production of luxury

items and trade, by means of taxes and of a task system, the «tarasija» system,

- the production of luxury items – most of the time in palatial workshops – from either local resources (e.g. olive oil, textiles) or imported raw materials (metals, ivory, precious stones...),

- the storage of food and non-food resources,

- the distribution of the collected surplus by means of a staple finance system (for the commoners) and a wealth finance system (for the rulers),

- regional and interregional trade, exports of agricultural and luxury products, imports of raw materials required for the production of luxury items.

The elite maintained its power and thus the control of the economy by various means. For instance, economic specialization made many groups in these states dependent on the elite for their economic welfare. They depended on produce redistributed to them for their income. Their economic dependence helped sustain the potential power of the elite. The staple and wealth finance systems played a central role in sustaining social cohesiveness, providing resources for those involved in economic specialization, consolidating the political power of the elite, supplying critically controlled resources for economic investment and development, for military use and for gift giving and feasting by the elite. Apart from economic bonding, these states relied significantly on social bonding and obligations to promote social cohesiveness and reinforce their social hierarchy. For example, the giving of gifts and provision of feasts by the elite were used to display their social superiority and political power, thereby reinforcing these social attributes. However, while for the most part institutional arrangements controlled the economies of these civilizations some parts of the economy were not subject to central control. Reasons for this were suggested.

The palatial centers derived power from collecting resources, imposing taxes, and directing the production and distribution of prestige items. The elite's actions resulted in escape from the Malthusian trap and fostered economic development of the Bronze Age Aegean societies. Moreover, the type of social and economic interdependence which developed in these states resulted in structures of governance that lasted for a very long time indeed.

Centrally controlled systems of this type enabled many of the economic advantages attributed to market systems to be obtained prior to the development of comprehensive market systems. These advantages included increased specialization, economies of scale and extension of trade. However, such systems may have been best suited to relatively small states. In larger states, economic co-ordination may have been more difficult and principal-agent problems involved in the hierarchical management of the economy would have become more pressing. Most likely the risks to the central authority of their agents thwarting their wishes or challenging their authority would have increased as the size of the state increased.

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- <sup>1</sup> For a complete chronological table of the Aegean Bronze Age, see Tartaron (2008, Table 1).
- <sup>2</sup> The most famous golden mask was attributed to the Mycenaean king, Agamemnon by its discoverer, H. Schliemann, in 1876, even if such attribution is still controversial.
- <sup>3</sup> As defined by North (1981).
- <sup>4</sup> And pre-monetary economies for the Bronze Age Aegean.
- <sup>5</sup> Recall that the successive Mesopotamian civilizations (Sumer, Babylon, Ur...) occurred between two major rivers, Tigris and Euphrates. Similarly the Nile played a central role in the Egypt of pharaohs (for all dynasties).
- <sup>6</sup> Rather than in well-watered and light soils (like alluvial deposits).
- <sup>7</sup> However the various similarities between the main three Peloponnesian palaces suggest that the political and economic systems of Mycenae and Tiryns were not very different from those of Pylos.
- <sup>8</sup> E.g. Mycenae, Tiryns, Pylos, Knossos...
- <sup>9</sup> Linear B, the writing of Mycenaean Greece, was at least simpler, being based on a syllabary of about 90 signs plus logograms.
- <sup>10</sup> The deciphering of Linear B, as an early form of the Greek language, has been achieved by Michael Ventris in 1952. Contrary to Mycenaean Linear B, Minoan Linear A has not yet been deciphered.
- <sup>11</sup> Although corvée labor was frequent elsewhere during the Bronze Age, for instance in Egypt (Haring 2009).
- <sup>12</sup> An equivalent word of «tarasija» in modern language could be «allotment». For more information on the meaning of this word, see e.g. <http://www.palaeolexicon.com/ShowWord.aspx?Id=16892>.
- <sup>13</sup> We use the terms «purposes» or «various uses» of the economic surplus rather than «redistribution» because the latter is quite problematic in the literature since it is often considered as the wholesale pooling of all economic production (Nakassis *et al.* 2011).

- <sup>14</sup> E.g. the Argolid road system was ideal for transporting agricultural products, raw materials, and finished craft products among the various communities and centers.
- <sup>15</sup> And to the existence of people working in groups according to their ethnicity.
- <sup>16</sup> I.e. inside the Aegean world, e.g. trade between Mycenaean palaces or regional centers.
- <sup>17</sup> E.g. between the Aegean world and other regions (Near East, Egypt...).
- <sup>18</sup> Except some specific ceramic types, such as kylikes.
- <sup>19</sup> For instance it is likely that palatial centers did not control all agricultural production because there is archaeo-botanical evidence for crops that were not recorded in Linear B tablets.

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