Power and Production in Ptolemaic Egypt

An Assessment of Economic Policy in the Third Century BCE

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ABSTRACT

This thesis considers the nature of Ptolemaic economic policy: its consistency, basic principles, and the functions and interrelations between the central and local state. Early scholarship viewed the Ptolemaic economy as controlled and planned by the central state, while it has been recognized in the past fifty years that economic direction occurred on the local level. These diverging views call for a consideration of the relationship between the central state and its local units, and for a reconceptualization of economic policy overall. To consider the principles and aims of policy, economic theory is employed to analyze its economic effects.

Particular focus is given to the regulations on importation. The possible role of the state in importing goods is explored, in addition to the prohibitions and tolls on trade emphasized in previous work. The mercantilist and protectionist aims attributed to this trade policy by earlier scholars are re-assessed by considering its effects and comparing it with internal economic policy. A suggestion is made that rights for importation and the collection of customs duties were auctioned in the same fashion that production, retailing, and taxation were in other sectors of the economy.

It is argued that the central state had a supervisory and coordinating role in the operation of economic policy, rather than directly planning the economy. State control of resources was a major aim of economic policy, but the central state devolved the management of these resources to nome officials and tax-farmers. This is based not only on previous work demonstrating the local administration's significance, but also by analysing the role of tax-farmers. It appears that the central state aimed to establish a largely self-enforcing system on the local level, allowing for revenue to flow to the king without requiring excessive involvement from high officials. In addition to this, by considering economic theory it is shown that the state's household management of resources would have resulted in far less efficient outcomes under central rather than local direction.

DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

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CONTENTS

ABBREVIATIONS

Except where noted, for all abbreviations of papyri and ostraka I follow J. F. Oates, R. S. Bagnall, S. J. Clackson, A. A. O'Brien, J. D. Sosin, T. G. Wilfong. K. A. Worp, *Checklist of Greek, Latin, Demotic and Coptic Papyri, Ostraca and Tablets*:

http://library.duke.edu/rubenstein/scriptorium/papyrus/texts/clist_papyri.html

AfP	*Archiv für Papyrusforschung und Verwandte Gebiete*
BASP	*Bulletin of the American Society of Papyrologists*
CAH	*Cambridge Ancient History*
CdE	*Chronique d'Égypte*
CQ	*Classical Quarterly*
CRIPEL	*Cahiers de Recherches de L'Institut de Papyrologie et d'Égyptologie de Lille*
IGCH	Thompson, M., O. Mørkholm, and C. M. Kraay. 1973. *An Inventory of Greek Coin Hoards*. New York, The American Numismatic Society.
JEA	*Journal of Egyptian Archaeology*
OGIS	Dittenberger, W. 1960a [1903-1905]. *Orientis Graecae Inscriptiones Selectae*, 2 vols. Hildesheim, Olms.
PMZ	*P. Mich.* I (see *Checklist*)
PCZ	*P. Cair. Zen.* (see *Checklist*)
SEG	*Supplementum Epigraphicum Graecum*
Syll.^{3}	Dittenberger, W. 1960b [1915-1924]. *Sylloge Inscriptionum Graecarum*, 4 vols. Hildesheim, Olms.

CHAPTER 1: INTRODUCTION

1.1 QUESTIONS, ISSUES, AND DEFINITIONS

In this dissertation, I consider the nature of economic policy under Ptolemy II Philadelphos and Ptolemy III Euergetēs. The scholarly understanding of this policy has undergone significant changes over the past century, with the earlier views perceiving a centrally and rationally planned command economy (Tarn 1928, 255-260; Heichelheim 1970 [1938], 189-194; Préaux 1939, 61-65, 569-570; Rostovtzeff 1941, 272-274) giving way to a realization of the primacy of the local administration in economic management (Vidal-Naquet 1967; Pikous 1970; Bingen 1978a; Manning 2010, 128), often on an *ad hoc* basis (Bingen 1978a; Samuel 1989, 51-65; 1993, 173-180), and with the preservation of temples as important administrative institutions (Manning 2003, 182-225; Vandorpe 2006). Despite this revision, the considerable influence of the state over the economy, as observed by the earlier scholars, is difficult to deny, and this suggests a need to clarify the nature of Ptolemaic economic policy and its relation to local institutions.

The principal question I ask is: to what extent can we see a consistency in the effects and aims of Ptolemaic economic policy as part of an overall program? This requires me to determine its effects and to identify its aims in order to evaluate these measures as a whole. My goal is to establish the ways in which the constituent parts of this policy relate to each other and from this, to determine whether there was an overall economic policy as such. As part of this, I focus on the relationship between the *dioikētēs*, the nome administration, and tax-farmers (*telōnai*). The delegation of functions to the latter two branches, rather than folding them into one, has been noted as a curious and possibly redundant feature of the administration (Préaux 1939, 450; Bingen 1978a, 166-168; Manning 2010, 155). I explore this question further, considering to what extent this was an unintended outgrowth of administrative changes, or if it was integral to the structure of economic policy.

In explaining the effects of this policy, I employ economic theory to broaden our understanding beyond what is explicitly stated in the sources. Although earlier writers looking at the Ptolemaic economy overall, such as Préaux (1939) and Rostovtzeff (1941), loosely imply theoretical considerations in their arguments, the only explicit application of economic theory in the understanding of the Ptolemaic state and economy is that of Manning (2003; 2010) in his use of Neo-Institutional theory. I continue in this vein in relation to understanding the operation of the administration, but I also use economic theory more specifically to explain the results of this policy. In this, I draw upon microeconomic theory to explain the effects of policy on exchange, in particular Krugman and Wells (2009) and Mankiw (2012), as well as the capital theory of the Austrian School of Economics (Rothbard 2004 [1962]; Mises 1998 [1949]). Through the use of this theory, I am able to form a fuller understanding of the Ptolemaic economy. This analysis of economic effects also informs my discussion of the perceived aims of policy. I outline the methodological considerations relating to the use of this theory in CHAPTER 2.2.1-2.2.5.

External trade in particular is an area of policy requiring further investigation. Trade policy has not been discussed in recent work on the Ptolemaic economy (excepting Bresson 2012), even where the economy has been considered overall (von Reden 2007; Manning 2007, 434-469; 2010; Monson 2012a). In addition to this, as I show, there are potential problems with some of the arguments advanced in earlier scholarship on this topic (e.g. Andréadès 1932; Rostovtzeff 1932; 1941, 381-398). By placing this trade policy in the context of overall economic policy, I demonstrate a new understanding of this important aspect of policy, which forms the basis of many of the previously-advanced ideas concerning the aims of the Ptolemaic state, such as self-sufficiency and the protection of local industry.

As discussed further below, scholars such as Préaux (1939) and Rostovtzeff (1941) have emphasized the purely *economic* goals of policy, seen for example in an increase in the production of goods or in the amount of revenue collected. In addition to those goals, I also consider the possible *political* aims of economic policy in this inquiry. As Eisenstadt (1963, 129) observes, this was one of the foremost objectives of the economic policy of historical empires, for which states made use of economic

measures in order to control the population of the realm. He notes, in particular, the provision of access to material goods to supporters and the limit of such access to uncooperative parties. Mann (1986, 24) likewise places economic power, which he defines as the control over production, distribution, exchange, and consumption, as one of the four major sources of social power. When I therefore mention 'political' aims of economic policy throughout this dissertation, I refer to the use of economic power as a method of rule and control. Manning (2003, 135-140) has considered the economic power of the Ptolemaic state in relation to land tenure, and where possible I extend this idea to consider the relationship between power and economic policy overall.

In terms of time-frame, I have restricted the inquiry to the reigns of Ptolemy II Philadelphos and Ptolemy III Euergetēs. This is for several reasons. First, the extent of surviving papyrological evidence greatly increases from the reign of Ptolemy II onwards; much of the surviving papyri relating to the economy dates to the reigns of these two kings. I discuss this evidence further below. To give a preliminary outline, it includes the Revenue Laws papyrus, the Zēnōn papyri, and important documents from the Tebtunis, Hibis, and Petrie papyri. The dates of some of the Zēnōn papyri are within the reign of Euergetēs, and so it makes sense to cover these reigns together. Since antiquity, a break in the stability of Ptolemaic government has been perceived to have occurred after the reign of Ptolemy III (Strabo 17.1.11), and this view has pervaded modern scholarship (Crawford 1971, 1; Turner 1984, 166-167; Manning 2003, 44-45, 230; 2010, 76). Although Manning (2003, 230-234) has questioned this sharp periodization, changes in policy (Vandorpe 2006, 166-168; von Reden 2007, 70-78) and later gaps in the evidence (Turner 1984, 159) mean that we can still view this period as distinct.

The Ptolemaic kingdom was at its height during the reigns of these two kings (Bevan 1927, 58; Rostovtzeff 1941, 27; Hölbl 2001, 304-305), and so the nature of economic policy in this period is of particular interest. Additionally, innovations in the economic system undertaken under Ptolemy II imply that there was a general overhaul or reform of the economy at this time (Rostovtzeff 1941, 267-274; Thompson 2008, 28-38; Manning 2010, 91). From the nature of the sources and the current understanding of the Ptolemaic dynasty, it makes sense to treat the reigns of Ptolemy II and Ptolemy

III as a distinct period in such a discussion. I do, however, refer to evidence from earlier and later periods where it might aid in understanding the period under investigation.

For the most part, I have restricted this inquiry to the situation within Egypt, which was the most significant part of the Ptolemaic realm and where the kings resided. The vast majority of the ancient evidence referred to above deals with Egypt, and the different conditions in the other parts of the Ptolemaic empire, such as Syria, Kypros, Kyrēnaika, and southern Asia Minor would require a much broader scope for which the necessary evidence to fully compare it with the Egyptian situation is lacking. I do, however, discuss these regions as they relate to the Egyptian economy, in particular regarding foreign trade. On economic policy in the foreign possessions specifically, see Bagnall (1976, 224-229).

The term 'economic policy' itself is borrowed from modern terminology and might be taken to imply that the Ptolemaic state employed this specific concept. Despite this, I do not assume that it was explicitly understood in Ptolemaic governance. The term 'economic policy' as I use it in this dissertation should be taken foremost as a short-hand to refer to all the official actions carried out by the agents of the state and directly concerned with the production, movement, and exchange of money and material goods. The question whether we can conceptualize these state actions as forming a consistent 'economic policy' as such is central to this dissertation, and I discuss this issue throughout. In CHAPTER 2 I outline my understanding of the Ptolemaic administration and the position I take on the use of economic theory in the study of ancient economies, as well as discussing the primitivist-modernist debate and its relation to understanding the Ptolemaic economy specifically.

In light of modern approaches, I have opted to transliterate Greek names keeping as closely to the original as possible, for example transliterating the ending 'ος' as 'os' instead of 'us', and 'κ' as 'k' rather than 'c'; however, familiar anglicized forms, such as 'Ptolemy', 'Pliny' and 'Macedon', as well as adjectives such as 'Attic', have been preserved. Arabic numerals have been uniformly employed for book and chapter numbers of all ancient authors. Greek terms have been transliterated and in the

same fashion as names, with 'η' appearing as 'ē' and 'ω' as 'ō'. All dates are BCE unless otherwise specified.

1.2 SOURCES OF EVIDENCE

As noted, the key evidence relating to economic policy for this period comes from papyri. The two most important examples for this study are the Zēnōn papyri and the Revenue Laws papyrus. I also employ other papyri from the 3rd century, such as those included in *P. Tebt.*, P. *Hib.*, and *P. Petr.*, for further evidence on the economy and operations of the administration. The Zēnōn papyri, mostly collected in *PCZ, PSI, P. Lond.* VII and *PMZ,* are dated between 261-229. For the most part they relate to the political and economic dealings of the *dioikētēs* Apollōnios and the *oikonomos* Zēnōn. Zēnōn, however, appears chiefly in the role of the manager of Apollōnios' *dōrea* or gift-estate, located at Philadelphia in the Fayum. As such, the Zēnōn papyri provide a wealth of information relating to the economic life of Ptolemaic Egypt, and also the relationship between the administration and the economy. Apollōnios as *dioikētēs* held an extremely important post within the administration in relation to the management of the economy (Manning 2003, 110), though we should be wary in assuming that he was one of the highest state officials and that therefore his dictates represent state policy (Turner 1984, 132). The Zēnōn papyri provide information extending well beyond the activities of the *dōreai* held by Apollōnios. Our chief sources relating to Ptolemaic trade policy come from this archive, in particular the documents *PCZ* 59012 and *PCZ* 59015-R. The most important studies concerning the Zēnōn papyri are Rostovtzeff (1922), Préaux (1947), Pestman (1981), Orrieux (1983; 1985), and Clarysse and Vandorpe (1995).

The Revenue Laws papyrus is a collection of documents relating to various contracts for tax-farming, including the *apomoira* tax on the first fruits of vineyards and orchards (*P. Rev.*, cols. 23-37), the operation of vegetable oil production (cols. 38-72), and, in a very fragmentary form, banking, and taxes on textiles (cols. 73-107). The regulations relating to the monopoly on vegetable oil are particularly important for this study, and I discuss them extensively (CHAPTER 3.2). The Revenue

Laws papyrus was originally published by Grenfell and Mahaffy (1896), with an important revision of the Greek text made by Bingen (1952). I also draw upon interpretations made in the partial translations by Bagnall and Derow (2004: 114), and Austin (2006: 296, 297). The Revenue Laws papyrus itself is not necessarily a complete set of legal regulations, planned and administered by the central government but is rather an *ad hoc* set of orders for use by the local nome administrations (Bingen 1978a, 157-188; Turner 1984, 151-52). This is discussed further in CHAPTER 3.2. In addition to papyri, tax receipts are also an important source of information on the relationship between the state and economy. These have been studied recently by Muhs (2005) and Clarysse & Thompson (2006). Classical authors such as Herodotos, Polybios, Diodoros, and Strabo also shed light on the economic conditions in Egypt before, during, and slightly after the Ptolemaic period. Where possible, I have also incorporated recent work making use of Demotic evidence.

Despite the wealth of contemporary evidence on the Ptolemaic economy relative to that of other ancient states, the record is still very fragmentary. In this reconstruction of economic policy, I understand that the evidence for a particular state action in one context does not necessarily mean that this was the general policy. This is particularly relevant regarding foreign trade. I nevertheless consider what this might tell us about the economy, without assuming that it provides the entire picture. Another difficulty I encountered is the enormity of the evidence relating to the Ptolemaic economy overall. This required a balance between considering all the relevant features of economic policy and analysing the most important of these in-depth. I focus, therefore, on economic institutions and elements of policy that appear to have been particularly significant and which also require further investigation.

1.3 PREVIOUS STUDIES ON THE PTOLEMAIC ECONOMY

There has been an extensive volume of literature published on various aspects of the Ptolemaic economy. Here, I focus on the most important works on the role of the Ptolemaic state in the economic life of Egypt and the effects its position had upon the economy. The sociologist and

historian Max Weber (1976 [1909]) provided an early analysis of the economy of Hellenistic Egypt. Weber (1976 [1909], 227) stressed the significance of the new use of coinage in the financial system of the state and also drew attention to the continuity between Ptolemaic and pre-Ptolemaic institutions, particularly in the importance of the temple-estates (Weber 1976 [1909], 243). He argued that the use of money in state administration does not demonstrate an overall use of currency, free pricing, and a capitalist economy (Weber 1976 [1909], 253).

Heichelheim (1970 [1938]) presented a detailed account of the development of various economic processes across the entirety of antiquity. In relation to Ptolemaic Egypt, he concluded that the king's administration had a significant role in the direction and extraction of resources, and that the expenditure of royalty would necessarily have been enormous during this period. In this Heichelheim (1970 [1938], 189) believed that the state had a degree of control over every aspect of the economy, for its own gain. He argued that on the whole, the taxes levied by the Ptolemies upon their subjects were beneficial to the overall economic development of Egypt at this time, due to the supposedly planned nature of the economy (Heichelheim 1970 [1938], 194). Like Rostovtzeff (1920; 1922) before him, Heichelheim (1970 [1938], 186) emphasized the role of state direction and planning in Ptolemaic Egypt. In this he compares Ptolemaic economic policy with the mercantilism of the 18th century European states (Heichelheim 1970 [1938], 186), and even with that of the 20th century (Heichelheim 1970 [1938], 189). He also argued, based on the Wilbour Papyrus, that Ptolemaic economic institutions bore a close similarity to those of Ramesside Egypt, in particular the systems of land tenure and monopoly industries (Heichelheim 1953, 130-135).

The most important work in establishing the operation of the Ptolemaic economy and the economic policy of the state has been undertaken by Préaux (e.g. 1933; 1939; 1947), in particular in her 1939 work *L'Économie royale des Lagides*. Préaux (1939, 431-432) argued that Ptolemaic economic policy was based on four goals: collecting the greatest amount of income, reducing expenditure to as little as possible, retaining the established institutions, and in all this taking the least amount of risk. She also advanced the idea that the tax-farming monopolies of Ptolemaic Egypt were based not on Egyptian precedents, but on Hellenistic institutions (Préaux 1954, 312-327). We see here that for

Préaux, the major focus of economic policy was the maintenance of the state treasury through a steady collection of revenue. In relation to the policy of Ptolemy Philadelphos in particular, she argued elsewhere that it represented a mobilization of the resources of the country, closely directed by the central state (Préaux 1933, 548).

Préaux (1939, 569-570) argued that the economy provided the state with a means for increasing its power through the wealth that came to the king. We see then that Préaux focused mainly on the economic functions of this policy, but also made a political link with what she saw as the most important aim of this economic policy. Préaux (1939, 514-557) also considered the effects of this policy, but mostly in relation to the operation of the administration and without any explicit use of economic theory. In this dissertation I take Préaux's inquiry further, and consider the means through which the state was empowered in its relations with the economy beyond the collection of revenue alone. I also look at the economic effects of this economic policy in greater detail and with an explicit theoretical grounding.

Rostovtzeff published two landmark works in the interpretation of the Ptolemaic economy: *A Large Estate in Egypt* (1922), and *Social and Economic Life of the Hellenistic World* (1941), in which his earlier observations were revised and expanded (Rostovtzeff 1920; 1932). In the former, Rostovtzeff examined the management of a gift-estate in the Fayum using the papyri of the Zēnōn archive, while in the latter he constructed an overall picture of Ptolemaic economy and society through a synthesis of a wide range of sources from the period. In both works, Rostovtzeff emphasized the role of the central state in directing the economic activities of its subjects and in reaping the output for its own purposes. He viewed the king as the owner of the majority of arable land in Egypt, which the monarchy was able to manage closely through the employment of an effective administration. According to Rostovtzeff, the state was interested in carrying out extensive operations across its empire in order to improve its revenue, and certainly held sufficient authority and means of enforcement to do so: whether directly through its bureaucracy and military or indirectly through the use of tax-farming. Rostovtzeff considered the imposition of price-controls and the establishment of monopolies as significant institutions of political control and of economic reward to the state. Indeed,

he saw the entire purpose of the administration as a means of increasing the revenues of the state (Rostovtzeff 1922, 128-129). As part of this system, Rostovtzeff (1941, 273-4) argued that free enterprise, which he characterizes as the essence of the Greek economic system, was for the most part absent from the economy.

Rostovtzeff not only discussed the role and aims of the Ptolemaic state in the economic life of Egypt, but also touched upon what he believed were the necessary effects of such practices. He argued that these included the general impoverishment of the Egyptian peasantry due to the burdensome levels of taxation placed upon them (Rostovtzeff 1941, 317, 320). Even so, he saw economic policy as aiming at self-sufficiency and an increase in overall production (Rostovtzeff 1941, 271-272). For this purpose, he believed that the state established a protectionist trade policy (Rostovtzeff 1941, 385) and central planning of the economy (Rostovtzeff 1941, 302).

Fraser's study, *Ptolemaic Alexandria* (1972), is particularly important for considering the question of trade policy. He generally agreed with the idea advanced earlier by Andréadès (1932, 19), Rostovtzeff (1941, 385) and Préaux (1947, 58) that the state attempted to restrict importation through the imposition of high customs duties (Fraser 1972/1, 150). I reconsider this often repeated assertion in CHAPTER 5.1. Bingen (1978a, 157-188) published an important article on *P. Rev*, arguing that the Revenue Laws is a collection of documents rather than a code devised as a singular plan. Based on this, we should not assume that state direction of industry or agriculture was centrally rather than locally controlled (Bingen 1978a, 178-179). This has important implications for understanding Ptolemaic economic policy.

Turner (1984) disagreed with the earlier proposed ideas of the success of Ptolemy Philadelphos' policies. Rather than a mobilization of the resources of Egypt, he saw Ptolemy II as responsible not only for disaster in his own reign, but for the problems of the later kings whose administration was based on the system he established (Turner 1984, 135, 159). Turner understood the Ptolemaic economy as comprised of two models. He argued that we should understand the first model as made up of the traditionally institutions inherited from a pre-Ptolemaic pharaonic past, with a second,

specifically Ptolemaic model imposed on top of this (Turner 1984, 152-153). I will refer to these categorizations of economic institutions throughout this thesis as Model I and Model II. He also importantly notes that we cannot assume that Apollōnios and the activities associated with him in the Zēnōn papyri had any necessary connection with state policy, since as *dioikētēs* he did not necessarily have the elevated position that earlier historians ascribed to him (Turner 1984, 143).

Finley (1985) was sceptical of any overarching, powerful and rationally planning Ptolemaic state. Although he grants that the records of taxation had a realistic basis in action, he believed that the decrees and administrative documents of the Ptolemies were not necessarily enforced and instead were employed for purposes of propaganda and to indicate the power of the king (Finley 1985, 34). This reflects Finley's 'primitivist' stance. I consider the academic debate relating to primitivism and modernism in CHAPTER 2.2.4.

Samuel (1989, 51-65) also questioned the conception of this economic policy as centrally planned, noting the continuity between pre-Ptolemaic and Ptolemaic institutions, and the importance of local officials in the Ptolemaic administration. Elsewhere Samuel (1993, 175) noted that we should not equate the complexity of the administration with a rational plan behind it: this complexity, he argued, is rather the result of the *ad hoc* nature of the development of the bureaucracy, which grew in response to unforeseen requirements. I consider the comparison between Ptolemaic Egypt and the European experience of colonialism, as discussed by Will (1985) and Bagnall (1997a), in CHAPTER 2.1.1.

Key studies dealing with the Ptolemaic economy in broad terms have been recently undertaken by Manning (2003; 2005; 2010), von Reden (2007) and Monson (2012a). Both Manning and Monson focus on the land tenure regime in Ptolemaic Egypt, while von Reden considers the monetary aspects of the economy. Manning (2003; 2010) looks at the institutional arrangements of property rights in Ptolemaic Egypt in particular, and the factors that led to such an arrangement historically. Manning (2010, 73-75) shifts the discussion away from merely conceptualising policy as central state direction, and emphasizes the bargaining for power that he argues occurred between the state and its smaller

administrative units or local elites. He focuses on Upper Egypt in particular and the interplay between temple estates, local administration, and the state. Manning (2003, 177-178) deals particularly with the process of defining and bargaining for the property rights, and the stability of the resulting property arrangements. As Coase (1960) pointed out, this is important because the process of defining property rights contains significant transaction costs. Because of this, if the property regime is well-defined and well-enforced, transaction costs are lowered and a greater economic efficiency is allowed.

Manning argues that the state in its bargaining process with local units of power was able to establish stable, well defined and well enforced property rights. He applies North's (1981) Neo-Classical theory of the state to understanding the Ptolemaic one (Manning 2003, 10), focusing on the interplay between the state and its constituent parts as well as the ways in which the bargaining process between them shaped state power and revenue. In my dissertation I borrow from this conclusion in considering the interests of individual officials in addition to those of the central state. In regard to the economic effects of these political structures, Manning (2003, 232) argues that there is no necessary link between the political dominance and stability of the central state and the degree of economic continuity and prosperity in Ptolemaic Egypt. He states that the decline in Ptolemaic political authority in the 2nd century was not necessarily accompanied by an economic decline (Manning 2003, 228-234). He also points out that the concept of the power of the central state in the economy has been overstated and existence of private property and markets has been understated (Manning 2003, 11). Like Préaux (1939, 431-432) discussed above, Manning (2003, 140-141; 2010, 1) ultimately views the main aim of the Ptolemaic state and its economic policy as revenue capture.

The monetization of the economy and the development of monetary institutions is an issue considered in recent literature (von Reden 2001, 65-66; Clarysse and Thompson 2006/2, 8, 347; Manning 2007, 445; von Reden 2007, 15; Thompson 2008; Manning 2010, 133). The collection of taxes in coin, both directly from tax-payers and indirectly through tax-farmers, was a significant innovation, and I discuss its importance in understanding Ptolemaic economic policy overall. I consider in detail the mechanisms leading to increased use of money by the population (CHAPTER 4.4), whether we can

consider this part of economic policy (CHAPTER 5.2), and the place of monetary revenues in the construction of economic policy (CHAPTER 5.4; CHAPTER 6.1). As a final note on past literature, we see that the view of an activist state directing a centrally planned economy has become more nuanced with the realization that it relied heavily on the traditional administration and local elites for its power. This revision has been considered in light of the administration overall, and particularly in relation to the agricultural economy, but has not as yet been applied to the overall understanding of economic policy as conceptualized by earlier historians. In this dissertation, I reconsider the idea of both specific and overarching aims of Ptolemaic economic policy, in particular in relation to trade policy, the purpose of the *telōnai*, and the purely economic aims of these state actions.

1.4 OUTLINE OF CHAPTERS

I have arranged the inquiry so that each chapter builds upon the last in a logical sequence. In CHAPTER 2, I present the method and the theoretical underpinnings of the dissertation, and discuss the nature of the Ptolemaic state. I also consider the problems in understanding the ancient economy generally, and the Ptolemaic economy specifically. CHAPTER 2, CHAPTER 3, and CHAPTER 4 deal directly with economic policy. In CHAPTER 3 I describe and discuss these economic policies, and consider the means through which the administration put them into effect. Drawing on economic theory, I explain the likely economic effects of policy in CHAPTER 4, and from this consider the aims and purposes of this policy in CHAPTER 5.

CHAPTER 2: FOUNDATIONAL CONSIDERATIONS OF THE STUDY

In CHAPTER 2, I lay the ground-work for the study. In doing this, I discuss the method employed throughout the thesis, outlining both my understanding of the Ptolemaic state and the theoretical approach underpinning this method. CHAPTER 2 is divided into two parts: in CHAPTER 2.1 I consider the institutions of the Ptolemaic state, including its administration, the major officials in relation to the economy, and the local elites. In CHAPTER 2.2 I outline the theoretical basis of the work, noting key terms and concepts relating to this and justifying the approach through a consideration of criticisms of it.

2.1.1 UNDERSTANDING THE PTOLEMAIC STATE

The Ptolemaic state, centred in Egypt, ruled by a Macedonian dynasty, and the successor of a Persian satrapy, was based on Egyptian, Macedonian, and Persian antecedents (Rostovtzeff 1941, 261-274; Turner 1984, 122-133; Bowman 1986, 22; Hölbl 2001, 3-5; Manning 2010, 21-28), each of them monarchical. Lloyd (1983, 334) notes that there were few changes to the administration of Egypt under Persian rule, and so we can understand a continuity in institutions at least as far back as the Saite period. In Egyptian tradition, the king was at the top of the governmental hierarchy, and held the right of appointing all officials (Lloyd 1983, 332). He has been regarded as having total control over the economic resources of his subjects (Rostovtzeff 1941, 316; Rathbone 2000, 45), and the relations between the state and the economy in Egyptian society has similarly been seen as an example of 'Oriental Despotism', most importantly by Wittfogel (1957). In this work, Wittfogel (1957, 274) discusses in general what he calls 'Hydraulic Society', citing Ptolemaic Egypt as an example.

By Hydraulic Society, Wittfogel (1957, 23) refers to civilizations he identifies as based on a particular division of labour and large-scale irrigation, requiring the mobilization of the entire community. This

supposedly required a state that wielded supreme political power (Wittfogel 1957, 27). The implication of this conception of Egyptian society is that the state was necessarily despotic throughout its entire history due to its method of agricultural production, with a central government determining the lives of its subjects. It appears, however, that Wittfogel's key assumption, i.e. that the irrigation sustaining these civilizations required the mobilization of entire communities along watercourses, is flawed, at least in relation to Egypt. The strong central direction that Wittfogel attributes to Egyptian irrigation practices, as an exemplar of Hydraulic Societies, was never apparent (Butzer 1980, 104; Manning 2002, 617-623; 2003, 183; 2010, 44). Water use was managed along local lines (Butzer 1999, 969; Manning 2002, 621), and the irrigation practices supposedly requiring a strong centralized state preceded the development of a central state chronologically (Butzer 1976, 107-112). The conception of the Ptolemaic state as a necessarily despotic one cannot be sustained by Wittfogel's theory, which has also been heavily criticized in general terms (see O'Leary 1989 in particular).

Although the state was extremely influential in directing certain aspects of economic production, as outlined in CHAPTER 3, we should not see this as a necessary outgrowth of the nature of its society as Wittfogel does. The roles and interests of individuals and institutions that made up the state, discussed below, and the ways in which the government dealt with these parties, demonstrate that we should not see the Ptolemaic state as a fixed and necessary form. Manning (2003; 2010) has recently published two important studies that consider the institutions of the Ptolemaic state and greatly aid our understanding of it. By questioning the accuracy of a purely despotic model, Manning (2010, 29-72) has demonstrated that in our understanding of state action, we should consider the interests of its constituent parts in addition to the nominal head of the state, and the bargaining over power that must have occurred between these parties. In this he emphasizes the role of local elites (Manning 2003, 235), which I briefly discuss below (CHAPTER 2.1.5). Manning focuses in particular on the position of the temples in this institutional framework, and in discussing the Ptolemaic state I give attention to other parts of the political and administrative machinery, relating directly to economic policy. I first consider key government ministers in general before looking at the role of the most significant economic agents: the *dioikētēs* and the *oikonomos*.

Institutions that carried out the operations of the state included the court, the administration, the military, the temples, and the law-courts. We should understand, therefore, that the actions of the state, including economic policy, were not only based on the interests of the king, but also on those of the individuals and groups that made up these institutions. This means that we can view the interests of the state as not only those of the king and his family but also as the interests of the other key members of his government in proportion to their influence (Thompson 2008, 37), even if these were merely considered servants of the king according to the state's informal constitution. This does not necessarily mean that there were significant conflicts between the interests of the king and the other political elites: as Delia (1993, 195) argues, we can imagine a symbiotic relationship between the king and his officials, as each could benefit by co-operating with the other. Nevertheless, we should not merely assume that the constitutional position of the king as ruler translated into a direction of policy only in accordance with his interests, excluding the interests of all others. Despite this, I occasionally use the word 'king' interchangeably with 'state' when discussing the actions and aims of economic policy.

To discuss this in further detail, we see that the influence of the king's ministers and their personal interests were of particular importance in guiding state policy during the reigns of Ptolemy IV and Ptolemy V. We happen to have detailed evidence of this from Polybios, our key source on the affairs of the Ptolemaic court (Rowlandson 2007, 32). Ptolemy IV is said to have relinquished the government of his realm to his ministers Sōsibios and Agathoklēs, who went on to murder Philopatōr's uncle Lysimakhos, his brother Magas, his mother Berenikē, and his sister and wife Arsinoë (Polybios 15.25). These ministers also took control of foreign policy and military recruitment (Polybios 5.63-64; 5.87.8), and even military command (Polybios 5.65.9). They cannot be taken as isolated examples, since the enormous influence of government ministers continued after Tlēpolemos ousted them. After his brief rise to power (202-201), he was succeeded by the hegemony of Aristomenēs of Alyzia (Polybios 15.31.6-7), and afterwards by that of Polykratēs of Argos (Polybios 18.55.4-7). This rule by government ministers is known only for the period after the reign of Ptolemy III. Even so, we cannot expect that the power of these ministers could have grown so

suddenly at the beginning of the reign of Philopatōr, and we should therefore acknowledge that the interests of high officials even under Ptolemy II and Ptolemy III were important in the formation of state policy.

Polybios does not discuss the reigns of Ptolemy II and Ptolemy III. We do not know, therefore, whether or not government ministers had a similar role under those kings. The lack of such knowledge concerning the governments of the first three kings, accompanied by our detailed knowledge of the perceived incompetence of their successors, has contributed to the development of what Manning (2003, 230; cf. 2010, 76-77, 115) has called the 'Polybios model' of Ptolemaic history. This model, however, is to an extent a result of the bias in our knowledge, notwithstanding the setbacks that occurred at the end of the 3rd century with the secession of Upper Egypt and the loss of overseas territory and Koilē-Syria. The historical record of the direct successors of Ptolemy III demonstrates the strong influence of government ministers. There is little reason, therefore, to believe that the situation was completely different during the reigns of Ptolemy II and Ptolemy III.

The operations of the Hellenistic states, including that of the Ptolemies, have also been compared to the administrations of the modern European empires in their overseas colonies, most importantly by Will (1985). In this article he focuses on the ways in which understanding the interactions that occurred between those colonial governments and the inhabitants of the conquered territories can inform our reading of the papyri and our view of similar interactions in the Hellenistic world. The central point of his study is that our view of Ptolemaic society is based on the perspective of the foreign, ruling power, and is therefore biased and seen from the position of the Hellenization of the subjects of these Graeco-Macedonian rulers (Will 1985, 279-280; Bagnall 1997a, 226-227; Manning 2010, 51).

This is borne out in his reference to petitions, in which he compares the ineffectual system that existed in Spanish Peru with the system of petitions in Ptolemaic Egypt, suggesting that we cannot simply assume that these petitions resulted in effective state responses (Will 1985, 292). Bagnall (1997a) has criticized this and other points raised by Will. He notes that although the Ptolemaic system of

recording does not allow us to know the period of time between complaint and action, we certainly have evidence of official response to petitions (Bagnall 1997a 233-234). Bagnall (1997a, 234) further notes that the surviving petitions likely come from archives of petitions that the state had in fact addressed. He also questions Will's (1985, 292) second example in which he compares the imposition of money taxes in both Spanish Peru and Ptolemaic Egypt as policies that forced the population to engage in wage labour (Bagnall 1997a, 234). The low amount of monetary taxation in Ptolemaic Egypt and the fact that coinage was already in use to an extent before the Hellenistic period makes this comparison a doubtful one also. I discuss this question of monetization extensively in this dissertation, and so I will not deal with it here.

Addressing the colonial approach overall, it is true that we can make some comparisons between the European colonial powers and the Ptolemaic kingdom, as they both faced similar problems of governing an established society initially as foreign rulers. But, as is borne out from Bagnall's treatment of Will's case studies, we cannot draw the parallels so closely as to believe that the *details* of colonial administrations can necessarily inform our understanding of Ptolemaic ones any more than a comparison with other bureaucratic empires could. Manning (2010, 52-54) argues that the continued importance of Egyptian institutions in the state demonstrates that there was not a simple transfer of complete power to a Greek elite. I detail my own view on the connection between economic policy and this Greek elite in CHAPTER 5.5, and the connection between the imposition of taxes in coin and monetization in CHAPTER 4.4 and CHAPTER 5.2.

In this connection I should also mention the comparison made by earlier writers between Ptolemaic economic policy and the mercantilist economies of Early Modern Europe (Heichelheim 1970 [1938], 186; Rostovtzeff 1941, 385; Préaux 1947, 58), and outline what is meant by this term. This itself is problematic due to the diverse institutional arrangements of the mercantile era (Ekelund and Tollison 1997, 23-24), but some important features as they might relate to Ptolemaic economic policy should be mentioned. The general aim of mercantilist policy was to increase the material wealth and power of the state (Ekelund and Hebert 1975, 30). Towards this goal, the regulation of the economy by the state was in practice the principle of policy (Grampp 1993, 73). This included the sale of monopoly

rights to trade in certain goods (Ekelund and Hebert 1975, 35), and securing a favourable balance of trade through a surplus of exports over imports (Ekelund and Hebert 1975, 31). Importantly, this did not necessarily mean a general state control over the economy, and in this we indeed see a dualism in mercantilist policy in which domestic intervention was seen as undesirable while intervention in external trade was promoted (Ekelund and Hebert 1975, 35-36). I discuss the validity of attributing mercantilist goals to Ptolemaic economy policy in CHAPTER 5.1.

2.1.2 THE PTOLEMAIC ADMINISTRATION

The Ptolemaic administration, especially as it related to land tenure, the assessment and collection of taxes in kind, and the role of the temples, was closely based on pre-Ptolemaic institutions (Johnson 1987, 142; Manning 2010, 17, 31). A fundamental change to this Egyptian basis came with the adoption of Greek as the main administrative language (Clarysse 1993, 187), which had occurred by the reign of Ptolemy II (Thompson 1992a, 324; Thompson 1992b, 46-47).[1] This clearly would have changed the composition of this ancient administrative machinery, since it favoured those who were literate in Greek. This, on the one hand, advantaged Greeks immigrating to Egypt, and on the other meant that traditional members of the native scribal class had to adopt the practices of the new regime in order to continue in that role. The evidence concerning the origins of officials confirms this idea, with the higher administrative and court positions largely made up of non-Egyptians, predominantly Greeks (Peremans 1971, 44; O'Neil 2006, 16-25). Some Egyptians, however, did serve in the administration as Greek scribes (Johnson 1987, 144; Clarysse 1993, 187-188). Demotic continued to be employed in the *chōra* throughout the Ptolemaic period. Thompson (2009, 408) notes that scribal bilingualism was a typical feature of the administration. Emphasis was placed on functional use of the Greek language rather than the specific ethnicity of the scribe (Samuel 1970, 450-453; Manning 2010, 88).

[1] As Thompson (1992a 47) notes, little evidence written in Greek survives from the first 50 years of Ptolemaic rule.

By the administration, I refer to the arm of the state charged with managing the king's household, which was a continuation of the pre-Ptolemaic system of governance based on the nome (Thomas 1978, 188; Turner 1984, 145; Manning 2003, 137; 2010, 17; on nome administration during the Saite period see Lloyd 1983, 334-336). This was made up of three bureaus established within each nome, and overseen overall by an official called the *dioikētēs*. The bureau responsible for agricultural production within the nome was headed by the nomarch, whose subordinates, responsible for smaller geographical areas, were the toparchs and komarchs (Rostovtzeff 1941, 269; Bagnall 1976, 3; Turner 1984, 146; Bowman 1986, 58-59; Manning 2010, 145). Parallel to these officials were those who kept the records of the nome: the *basilikos grammateus* and his *topogrammateis* and *kōmogrammateis*. The *oikonomos,* meanwhile, was in charge of nome finances and the general overseeing of economic activity. Lower level tax-collectors (*logeutai*) were also employed, for example in relation to the salt-tax (Clarysse and Thompson 2006/2, 76-77). It appears that Greeks generally held the highest offices, while Egyptians occupied the lower ones, relating to local administration (Peremans 1971, 44; Crawford 1978, 198; Johnson 1987, 143; Manning 2010, 147). The posts were voluntary, and officials were paid salaries for their service (Monson 2012a, 228-229), although Crawford (1978, 201) notes it is likely their pay had to be supplemented with unofficial income, including bribes and protection money. There is evidence from the 2nd century of officials making payments to secure their posts, in particular *P. Tebt.* I 9-10, but we cannot assume that this practice occurred in the previous century, or if it did, that it was the general rule.

Although there is no evidence of a typical hierarchy of posts that might represent the life career of an official (Turner 1984, 147), the use of promotion as a reward for good service is clearly demonstrated in *P. Tebt.* III.I 703, 272-278 (trans. Bagnall and Derow 2004: 103):

> …and your next duty is to behave well and be upright in your district, to keep clear of bad company, to avoid all base collusion, to believe that, if you are without reproach in this, you will be held deserving of higher functions…

Also related to the officials of the administration, and, indeed, to economic policy, were the tax-farming agents known as *telōnai*, which I discuss in depth in CHAPTER 3.1.5 and 3.2. Of the officials of the administration, two key posts that relate to economic policy in particular were the *dioikētēs* and the *oikonomos*, and I discuss them here accordingly.

2.1.3 THE *DIOIKĒTĒS*

The *dioikētēs* was the general administrator of the king's household and therefore of the economic affairs of the realm (Rostovtzeff 1941, 269; Yoyotte 1989, 73). The office has often been as seen as the king's chief finance minister (Bagnall 1976, 4; von Reden 2007, 19; Manning 2010, 162; Monson 2012a, 180) or even his prime minister in general (Tarn 1928, 254-255; Bingen 1978a, 158; Turner 1984, 143). The significance of his administrative and financial duties is clear, since the three branches of the nome administration reported to him (Bagnall 1976, 4). The *dioikētēs* was responsible for the supervision of his subordinates, including judging and punishing them for negligence, shown for example in in *P. Rev.* cols. 19 and 46.

Yoyotte (1989, 73-87) argues that the office of *dioikētēs* was not an entirely new creation of the Ptolemaic dynasty, but was rather based on the post held by the manager of the king's household during the Saite and Persian periods (see also Thomas 1978, 191-192). Apollōnios, who served Ptolemy II, is the most well-known Ptolemaic *dioikētēs*, since the Zēnōn papyri relate in large part to his personal and business dealings. The extent of his influence is demonstrated in the mention of the 24 nomes under his management in *P. Rev.*, cols. 31 and 60-72.

Despite the fact that the *dioikētēs* was the head of the financial administration, he does not appear to have been the chief minister of the king's government in general, since it is likely that the post was not at the top of the governmental hierarchy: Turner (1984, 143) suggests that during this period it was somewhere between sixth and tenth. In addition to the position of those at court who occupied these higher ranks, the political influence of the *dioikētēs* was also counter-balanced by the *stratēgoi*, who were directly appointed by the king and in the 3rd century were not subordinate to the *dioikētēs*

(Bagnall 1976, 4-5). The fact that the *dioikētēs* did not hold one of the highest positions in court does not mean, however, that his office did not have the most significant sway in terms of the economy.

An implication of this is that we cannot necessarily equate the policy developed by the office of the *dioikētēs* with the will of the king, nor assume a consistency with that policy and those pursued by the state in other spheres. This means we should understand that the development and operation of Ptolemaic economic policy as based not only on the interests of the king but also on those of the *dioikētēs* and his subordinates. There were not necessarily significant conflicts of interest in this, especially as we can imagine that pleasing the king was conducive to one's personal advancement. Nevertheless, the extent of the administration and the degree of economic control it had, discussed in CHAPTER 3, afforded the *dioikētēs* significant personal influence.

We can further understand the role of the *dioikētēs* in the administration and the formation of economic policy by considering the Revenue Laws papyrus. This document itself appears to have come from the office of the *dioikētēs* (*P. Rev*, col. 38; Bingen 1978a, 158). Although it includes a list of officials to whom it was sent by Ptolemy II, including *stratēgoi*, hipparchs, nomarchs, toparchs, *oikonomoi*, *antigrapheis*, *basilikoi grammateis*, libyarchs, and the chiefs of police (*P. Rev.*, col. 37), it was not addressed to the *dioikētēs*, likely because his office issued it. There is also fragmentary reference to Apollōnios the *dioikētēs* by name (*P. Rev.*, col. 23) at the end of a short section on disputes and appeals (*P. Rev.*, cols. 21-22), for which he was responsible. The *dioikētēs* was given the chief role in enforcing the regulations contained in the document (*P. Rev.* cols. 19; 46). The *oikonomoi* were required to submit their accounts to the *dioikētēs* every month (*P. Rev.*, cols. 18-19), demonstrating the latter's supervisory role over the nome administration.

The fact that we can attribute the extensive regulations contained in the Revenue Laws papyrus to the office of the *dioikētēs* implies that this was the major department in which we might expect the formation of economic policy to have taken place. But we must not apply this idea too broadly. Certain features of economic policy, such as the system of land tenure and taxation in kind, clearly demonstrate close continuity with pre-existing economic conditions (Turner 1984, 149-150; Vandorpe

2000, 167; Manning 2003, 49), which we cannot consider as introduced by the *dioikētēs*. It is likely, however, that Ptolemy II's economic reforms, discussed in CHAPTER 3, were developed under the *dioikētēs'* direction. Ptolemaic economic policy, therefore, was not only the policy of the kings, but also that of the *dioikētēs.*

2.1.4 THE *OIKONOMOI*

The officials charged with the supervision of finances in each nome were the *oikonomoi*. Despite being subordinate to the *dioikētēs,* the *oikonomos* clearly had his own staff including clerks called *antigrapheis*, mentioned, for example, throughout the Revenue Laws papyrus. *P. Tebt.* III.I 703, dating to the late 3rd century, contains a set of general instructions given to an *oikonomos* by a *dioikētēs*, and is the most substantial record of the *oikonomoi*'s duties in a single document. This was possibly a general set of established regulations relating to the office (Polacek 1970, 424). From the remaining text, the instructions relate first to the supervision and direction of cultivation, including the inspection of canals, the examination of crops, ensuring that they are grown according to the sowing schedule, and even raising the morale of the cultivators, as well as receiving their complaints. In connection with this the document notes the use of royal cattle for ploughing, which too came under the direction of the *oikonomos* (*P. Tebt.* III.I 703, 64-70).

The supervision of industrial production is also mentioned as an important task here, relating to both weaving and vegetable oil production. In this, the *oikonomos* was charged with preventing corruption and thefts, and had to ensure that as much production as possible was carried out, while keeping the capital goods required for this closely under state control (*P. Tebt.* III.I 703, 135-160). The *oikonomos* is also ordered here to collect the *ennomion* tax on the pasturage of cattle (*P. Tebt.* III.I 703, 165-174), and to supervise prices, both those set by the state and those set by the sellers of goods (*P. Tebt.* III.I 703, 175-184). Other functions mentioned in this document are the loading of grain on ships, to be conveyed to Alexandria, assessing the planting of trees and of the royal houses and gardens, and finally the arrest of deserting soldiers.

I note the contents of *P. Tebt.* III.I 703 in this detail since they demonstrate the broad functions and responsibilities of the *oikonomos*, and show it to have been a significant post in relation to the economic affairs of the nome. The Revenue Laws papyrus supplements and supports this picture. As in *P. Tebt.* III.I 703, we see the *oikonomos* involved in the assessment of cultivation (*P. Rev.*, cols. 24-29), the direction of the use of capital goods, including sealing them up when their use is not permitted (*P. Rev.*, col. 46), and the supervision of tax collection and accounting (throughout *P. Rev.)*. On the last point in particular, *P. Rev.* provides much more information than *P. Tebt.* III.I 703 does. Here we see the *oikonomoi* as overseers of collecting taxes that had been auctioned off to *telōnai.* These relate most importantly to the *apomoira* tax on the first fruits of vineyards and orchards, and those on vegetable oil production, both the cultivation of the seeds and the sale of the final product. The *oikonomos* in this context is a middleman between the tax-payer and the *telōnai*, responsible for monitoring their accounts. This position is likely a result of the graft of this new institution of tax-farming onto the already existing administrative system (Préaux 1939, 450), which included the *oikonomos*, and also functioned as a means of enforcement, occasioned by splitting these roles and incentives between various officials. I discuss the latter point extensively in CHAPTER 3.2. The *oikonomos* also had this role as a third party for the sale of the finished product, which he delivered to the retailers, receiving the profits to be handed over in turn to the *telōnai* (*P. Rev.*, cols. 47-48).

Just as in *P. Tebt.* III.I 703, we see the *oikonomos* as responsible for the general supervision of the nome economy in the Revenue Laws papyrus, including taxation, the setting of prices, and the use of capital goods. The broad functions of the *oikonomos* might tell us something about the nature of this economic policy. Although regulations and instructions as contained in the papyri were sent out by the *dioikētēs*, representing the policy of the central government, the *oikonomoi* nevertheless had to employ their own judgement in carrying out their diverse duties and directing their subordinates (Polacek 1970, 415-416). As Bingen (1978a, 176) notes, even the Revenue Laws papyrus does not provide a full set of instructions relating to the vegetable oil industry, and it is likely there was room for varying conditions to prevail in different workshops or nomes.

2.1.5 LOCAL ELITES

There were other important institutions connected with the administration that functioned as intermediaries between the king's high officials and the majority of the population. An example is the local elite drawn from the native population, whose status demonstrates the continuity between Ptolemaic and pre-Ptolemaic institutions. These local elites included both individuals, such as village elders and priests, and the temple organizations; it was they who kept the traditions and enforced the customary norms. Lloyd (1983, 305) notes that kinship ties were significant in priestly appointments in pharaonic times, and family connections in the administration continued to play a vital role in the Late Period, and under the Ptolemies (Crawford 1978, 200-201). Hieroglyphic inscriptions demonstrate that important local officials presented themselves in the traditional image of the nomarch, emphasising his military, administrative and religious duties, as well as his service to the king (Lloyd 2002, 123-131; Baines 2004, 34-43).

Although there was no indigenous landed aristocracy in Ptolemaic Egypt (Préaux 1939, 461-462), temple-estates controlled substantial areas of land and their accompanying revenues (Johnson 1986, 71-73; Clarysse 2010, 280-283; Manning 2010, 83). The temples, therefore, are central to this concept of local elites, since their role as the keepers of traditions and the stewards of land, on behalf of the gods, including members of the royal family, went hand in hand. In the *chōra*, the priesthood was for the most part made up of the Egyptian elite (Bowman 1986, 124; Manning 2012, 82; Monson 2012a, 211); their communal power operated on both a social and political level. The temples served important functions of local administration, including the survey and registration of land (Manning 2003, 146-148), and in the Thebaid, the collection of taxation in kind on private plots (Vandorpe 2006, 167-168). Under the Ptolemies, the priests also played a role in the judicial system as it related to Egyptians (Evans 1961, 161-163; Allam 1991, 120); this gave them the right to adjudicate on matters of the ownership and transfer of property. Priests came to be the only political group among the Egyptians (Manning 2010, 97), and as administrators of the temples, they were the only parties, other than the king and his high officials, who had significant land holdings. Clarysse (1979, 732, 735) argues that most wealthy Egyptians were drawn from the priestly class, and formed a property-

holding elite comparable to the Greek military officers and settlers. Their status and the state's adoption of native administrative institutions suggest that the interests of this native elite class influenced the development of economic policy; it was not simply imposed upon them by the kings' high officials.

2.2.1 THE USE OF ECONOMIC THEORY

Here I describe the basic theory underpinning my analysis of economic effects in CHAPTER 4. In this, I employ a general neo-classical framework, exemplified in the works of Krugman and Wells (2009) and Mankiw (2012), and draw on the methodological and theoretical observations of the Austrian School of economics. I make use of the Austrian School for several reasons. First, within this framework economics is explicitly viewed as a value-free science, of which the purpose is not to suggest a course of action but simply to explain the causes and effects of economic phenomena (Kirzner 1994, 313-319).[2] The pre-requisite for its application is the existence of institutions of exchange, and so where we can identify this, it can be applied to a Ptolemaic setting. I discuss the existence of such exchange and the criticisms of applying economic theory to the study of pre-modern societies in CHAPTER 2.2.4. The micro-economic theory of the Austrian School is further suited to such a study since it is qualitative rather than quantitative, and uses verbal rather than mathematical explanations (Rothbard 2004 [1962], 75-76). The lack of data makes any quantitative study of the Ptolemaic economy very difficult, while our knowledge of some important aspects of state policy allow us to attempt to explain their economic effects employing this theory.

Another key aspect of Austrian theory is its emphasis on the study of capital goods, which I outline below (CHAPTER 2.2.2). In particular, it has the potential to provide insights about the effects of the Ptolemaic state's control of production in connection with the Austrian conception of the economic calculation problem. In stating this use of Austrian economics, I should nevertheless note that the

[2] Value-free, positive economics is of course not restricted to this branch of economic thought (Krugman 2009, 37-38; Mankiw 2012, 30-31), but is emphasized by the Austrians.

school generally remains in the mainstream Neo-Classical tradition, which allows me to draw on both Austrian works as well as the standard works on micro-economics mentioned above.

Economics is concerned with the management of scarce resources. Mankiw (2012, 4-5) frames the first principle of economic as the fact that people face trade-offs. At the most basic level, then, economic theory can apply wherever there is this requirement to economize. Economic theory largely focuses on this in relation to prices and their determination in the market. We can therefore apply this theory where markets and prices exist, in any form. Economics employs counterfactuals or imaginary models in order to assess the effects of changes in data. This is necessary since it allows us to consider effects of individual changes, which is not possible in a real-world market where many changes occur at once. In this dissertation I draw on the general principles that are explained by these economic constructions, applying them in particular to analyze effects of taxation, control of prices, and control of production goods (see CHAPTER 4).

2.2.2 PRODUCTION AND CAPITAL GOODS

Since I focus in particular on production, it is necessary to outline some related concepts. A classification of the factors of production gives us the three classical categories: land (or nature), human labour (including human capital), and capital goods (Rothbard 2004 [1962], 10; Krugman and Wells 2009, 29; Mankiw 2012, 376). Each of these is an input employed in the production of some other good, hence the term production goods or factors of production. This classification is not based on intrinsic qualities but depends on an individual good's employment. Certain objects might be employed as either production or consumption goods, e.g. seeds can be eaten directly or planted.

The structure of production is the arrangement of the factors of production towards a specific consumption good (Rothbard 2004 [1962], 329-333). This good is said to stand at the lowest order of production. The next highest order contains the factors of production directly employed to produce this consumption good. The order above that is comprised of the factors of production directly employed to produce the capital goods of the order lower than this, and so on. The concept of the

structure of production allows us to understand the complexity of the production process and points to the importance of capital goods.

Capital goods are a more roundabout means of production than the other factors of production (Mises 1998 [1949], 487-490). This means they necessarily employ a lengthier process, entailing lengthening of production away from the ultimate aim of consumption (Rothbard 2004 [1962], 51). Capital goods are produced either to facilitate the production of new goods or to allow a greater degree of output. The aim of investing in capital goods, therefore, is ultimately to have a greater degree of consumption in the long-term. Their manufacture can come about through the use of the other factors of production as well as other capital goods. Capital goods can be consumed and so the possibilities for production from them are limited (Mises 1998 [1949], 511-513; Rothbard 2004 [1962], 53). Thus the capital stock is not static and maintenance of this stock is required. Capital goods are heterogeneous, i.e. they are employed for specific purposes and cannot all be employed for the same purposes.

These capital goods are extremely important in the overall production of goods, since they allow new methods of manufacture. Many of the economic changes from the Neolithic period until modern times can be understood as developments in the uses of capital goods and the enlargement of the capital stock (Heichelheim 1970 [1938], 103). Technical knowledge is important in discovering the different complementary employments of the factors of production, but without the possibilities of actually employing these factors, this technical knowledge has no effect on the ultimate degree of production and consumption. Mises (1998 [1949], 493) illustrates this by pointing to Romania in the 19th century, where there was a wealth of foreign experts, and technical knowledge could be easily accessed, but a scarcity of capital goods.

2.2.3 THE PROBLEM OF ECONOMIC CALCULATION

These factors of production can be employed in a variety of complementary ways. The problem of economic calculation refers to the impossibility of comparing the relative effectiveness of each of

these methods of production where there is no common unit of measurement (on this see Mises 1998 [1949], 207-210; Rothbard 2004 [1962], 614-616)). This impossibility means that the tendency to invest in more complex, roundabout methods of production, i.e. capital goods, is greatly reduced due to the increased risk resulting from this great uncertainty. The result is that, where there is no ability to compare the relative efficiency of factors of production, the structure of production remains at a basic level and there is a much greater reliance on the other factors, land and labour. This prevents the possibility of benefiting from the unique products and greater productivity that can come from an intensive use of capital goods. A common unit of measurement, such as the prices of factors, can allow a comparison of the uses of the factors of production. Where there are prices for the use of factors of production, including capital goods, the cost of employing any of these can be directly compared against one another. This conception of economic calculation and its prerequisites is important for my analysis of the state control of factors of production as presented in CHAPTER 4.2.

2.2.4 EMPLOYING ECONOMIC THEORY: THE PRIMITIVIST OBJECTION

Applying economic theory to ancient history has been criticized from many quarters: by the historicists of the 19th century (Bostaph 1994, 459-464), by the substantivists, in particular Karl Polanyi (1944; 1957; 1977) and by the primitivist conception of the ancient economy, articulated most influentially by Finley (1973). Since primitivism is an influential view in scholarship (Engen 2005, 359) and my use of economic theory relies on principles it criticizes, I briefly discuss it here. The primitivist position sees economic activity as embedded in social and political institutions, and consequently argues that the markets and economic rationality of modern economics cannot be ascribed to ancient economies (Morris and Manning 2005, 32-33). Under this view, ancient economies were focused on agricultural and household production, preventing significant markets from developing (Hopkins 1983, xi-xii). The human motivations implied by economic theory, then, would not apply to societies of the ancient world. My view is that it is not necessary to draw such a strong dichotomy between primitivist and modernist economic processes, and that the existence of

economic activity within societal and political institutions does not preclude the existence of supposedly disembedded market exchange or price formation (Jones 2014, 5). This is particularly the case in relation to Ptolemaic Egypt.

Market exchange and price formation certainly existed in the ancient Greek world, playing a significant role in the allocation of goods (Cohen 1992, 4; Loomis 1998). Samuel (1984, 187-206) has considered the use of coinage in Ptolemaic Egypt, with primitivist influences. Drawing on transactions recorded in Ptolemaic papyri, he argues that the inconsistent prices apparent in his sources present a problem to a wholly modernist view, even though he notes the general presence of 'economic man' in them (Samuel 1984, 187). Samuel (1984, 200-201) compares the use of coinage in the Ptolemaic period to Ayrout's (1938) description of the modern Egyptian peasant's economic attitude. From this he argues that currency did not represent a cohesive system, its value merely representing the loss incurred by a payment rather than indicating the relative value of goods against each other (Samuel 1984, 205). He seems to be emphasising opportunity cost as the major consideration in spending decisions in this environment. It is strange, then, that he claims this is inconsistent with economic theory. The idea that exchange implies opportunity cost is a basic consideration of economics (Krugman and Wells 2009, 7-8; Mankiw 2012, 5-6).

Samuel (1984, 205-206) suggests a dichotomy between the prices set by the state and those that arose out of private negotiation. He attributes market forces to the former, while believes the latter are based on subjective preferences, explaining high prices and wild swings in them. But these are ultimately the same phenomena, as market prices result from a recognition of supply and demand based in part on subjective preferences. In this, Samuel rightly emphasizes the subjective valuation of goods in exchange, but misses the mark in arguing that this contradicts economic theory.[3] The high prices that he reports for goods most likely reflect the scarcity of the good in a given area rather than a particular mentality, or alternatively a difficulty in understanding the true value of the recorded

[3] Rothbard (2004 [1962], 343) states: '…it is clear that the determinants of price are *only the subjective utilities of individuals* in valuing given conditions and alternatives. There are no "objective" or "real" costs that determine, or are co-ordinate in determining, price.' (Emphasis in original)

transaction. He also notes the institution of traditional prices, which can be understood as a response to problems in exchange that arise due to the lack of information (i.e. relatively high transaction costs), ultimately based on supply and demand (Jones 2014, 5-6). Samuel's emphasis on subjective valuation and opportunity cost in exchanges supports the view of economics, demonstrating that the use of coinage by the peasantry does not contradict the expectations of economic theory.

Although coinage as money became popularized in Egypt during the Ptolemaic period, which some see as a monetization process (von Reden 2001, 65-66; Clarysse and Thompson 2006/2, 8, 347; Manning 2007, 445; von Reden 2007, 15; Manning 2010, 133), other forms and institutions of exchange were well established by this time. Institutions of both direct and indirect exchange helped to counteract the high transaction costs that might prevent simple barter, which requires a double coincidence of wants. Graeber (2011, 21-41) has pointed out the paucity of evidence for simple barter across all cultures, and so it is very doubtful that production purely for direct exchange played any large role in the Ptolemaic economy. In Egypt, there had long been an institution of money-barter or equivalence prices. The most detailed sources on the Egyptian operation of money-barter, as attested at New Kingdom Deir el-Medina, have been studied most influentially by Janssen (1975b; See also Kemp 1979; 2006, 319-326; Zingarelli 2010, 53-67).

In this system, goods were valued against the *deben*, which allowed for them to be valued against each other, facilitating exchanging. As Kemp (2006, 319-322) argues, the transactions recorded in the evidence from Deir el-Medina demonstrate that prices fluctuated within a small band over a long period of time, suggesting that supply and demand was the central factor in their formation. It is also possible that within the equivalence system, some goods were more marketable than others and were more commonly employed as media of exchange. At the base of the institution of equivalence prices, we can also understand the existence of more straightforward indirect exchange using commodity money (Bleiberg 1996, 25-26), even if, as the evidence from Deir el-Medina shows, a particular form of money was not used in day-to-day transactions. This is nevertheless demonstrated by the valuation of prices against the *deben* as a common unit, referring in this context to a weight in copper.

Exchange and a form of prices, therefore, preceded the use of coinage in Egypt. Adaptation by the Egyptian system of equivalence prices to the Greek system of coinage is suggested by the reference to the new money system in the terms of the Egyptian one, i.e. the term *deben* could refer in the Ptolemaic period to the coinage of the new state (Rowlandson 2001, 151; Muhs 2005, 24; von Reden 2007, 49). Greek institutions of indirect exchange in the use of coinage were well developed by the Hellenistic period. Coinage had become the standard method of exchange in Greek economies, with virtually all paid professions taking wages in coined form, apparently according to the dictates of the market (Loomis 1998, 251-254). In Ptolemy II's Egypt, we see references throughout *P. Rev.* to the existence of prices, wages, and fines quoted in terms of obols, drachmas, and talents, and the Zēnōn papyri in general demonstrate the use of coinage for transactions, payment for labour, and loans (Préaux 1947, 65-66; Orrieux 1983, 28-37). The economy in kind, however, continued to exist in Ptolemaic Egypt, and the use of coinage was fundamentally interrelated with it (Criscuolo 2011, 166-175). The employment of coinage as money allowed for a greater degree of indirect exchange in the economy and a lessening of transactions costs relating to trade, and therefore a greater degree of production for the market (Silver 1995, 157; Osborne 2007, 292-294).

To return to primitivism and modernism, it can be misleading to describe the differences between ancient and modern economies as those of mentality or behaviour (Silver 1985, 139). Due to the changing circumstances that accompanied the rule of Egypt by a Graeco-Macedonian dynasty and transformed many aspects of the Egyptian economy (von Reden 2006, 170-175), a strict dualism between embedded and disembedded is even less helpful in understanding the economic processes of the Ptolemaic period (Manning 2011, 315-318). To draw this back towards the discussion of understanding the relations between the state and economy, we see already that in the 4th century, various means of generating revenue were considered in extant writers, namely Xenophon (*Poroi*) and Pseudo-Aristotle (*Oikonomika* 2). This not only indicates that the interplay between state policy and the economy were objects of inquiry, but also that cause and effect were considered and in economic terms. From this we can suppose that similar considerations were undertaken by the Ptolemaic state, most likely in the office of the *dioikētēs*.

2.2.5 METHOD

One major aspect of the inquiry concerns the effects of this economic policy. There are, however, methodological problems in attempting to discuss such economic effects. First, the sparse nature of the sources, biased towards the particular sectors, means that our understanding of the Ptolemaic economy is fragmentary, especially for the reign of Ptolemy I. This means that we cannot adequately compare earlier conditions with those existing after the reforms under Ptolemy II. The greater problem is in attempting to demonstrate cause and effect. Any cause and effect explanation necessarily relies on some kind of theoretical consideration, even if it is not explicitly outlined. In terms of the theoretical framework underpinning my understanding of cause and effect, I employ economic theory as a means of explaining these effects. I undertake this investigation of economic effects in CHAPTER 4.

This economic theory is based on the empirical study of modern economies, and also, importantly, on the logical analysis of the consequences of particular conditions and actions. Although there are potential problems in employing theory that is not based on a more thorough, positivist testing, the very nature of societies and economies are such that theory cannot be developed on the same lines as that of the physical sciences (Mises 1998 [1949], 31). Despite this, economic theory was developed to explain real-world phenomena, and although grounded in logical considerations, its formation is tempered by its ability to explain the actual economy. In applying this theory, we must ensure the conditions correspond to the particular conditions of the Ptolemaic economy under investigation. I therefore apply this theory only where these conditions appear to match up, for example in relation to the effects of tariffs, the state control of factors of production, and the state control of prices.

In CHAPTER 5, I consider the aims of policy in light of effects explained in CHAPTER 4, but I do not assume that this explanation necessarily provides us with the purpose of this policy. It is possible that unintended consequences of policy could have occurred, and this forms part of my analysis, which questions some of the assumptions that earlier scholars such as Rostovtzeff (1941) had concerning

this policy based on their view of its effects. An understanding of effects nevertheless broadens our investigation into the aims of economic policy, and creates a criterion for assessing the consistency of this policy. In addition to this theoretical approach, I employ the looser historical analysis in the vein of Max Weber's conception of *verstehen* (see Albrow 1990, 199-226). This is grounded on my understanding of the Ptolemaic state, its positions and its interests, outlined above.

CHAPTER 3: THE NATURE AND OPERATION OF PTOLEMAIC ECONOMIC POLICY

In CHAPTER 3 I give an outline of Ptolemaic economic policy. From this I discuss the administration of this policy and the measures through which it was made effective. In CHAPTER 3.1 I consider the systems of land tenure and the methods of taxation, both in kind and in coin, before noting the state's control over industry, external trade, internal trade, and the currency. In CHAPTER 3.2 I then consider in greater depth the regulation of the vegetable oil monopoly, in order to explain its mechanisms and the relationship between the different agents of the administration. I also make preliminary observations on the consistency and functions of policy. In this broad consideration of policy, and due to the limits of the inquiry, it is not possible to investigate all of its aspects in full detail.[4] My purpose is rather to give a survey as a basis of discussion in CHAPTER 4 and CHAPTER 5.

3.1.1 LAND TENURE IN PTOLEMAIC EGYPT

The classification of land tenure was closely connected with economic policy, since it was based on fiscal categories (Monson 2012a, 75). This differentiation of types of land tenure on a fiscal basis did not necessarily correlate with differences in the rights attached to it, for example of sale or lease, nor does it indicate that rights attached to land use were uniform within each category. Due to the significance of agriculture and its products in the economy, considering the land tenure regime is central to understanding economic policy overall. Heichelheim (1953, 130-135) noted a similarity between the Ptolemaic land tenure regime and that of the Ramesside period, demonstrating strong continuity with the past in this area of the economy. The three major land holding institutions of the Late Period: the crown, the priests and the military (Lloyd 1983, 327) endured in the Ptolemaic period

[4] This task has already been undertaken, for example, by Préaux (1939), Rostovtzeff (1941), and Manning (2003; 2010).

in the form of *basilikē gē, hiera gē*, and *klerouchikē gē*. Turner (1984, 149-150) emphasizes this traditional sphere of the economy by conceptualising it as Model I, in contrast with the monetary economy (Model II) developed by the Ptolemies.

Royal or Crown land, *basilikē gē*, refers to land on which tenants paid rent directly to the king (Rostovtzeff 1941, 277-280; Rowlandson 1985, 338; Manning 2007, 452; Monson 2012a, 76). The extent of royal land was particularly significant in the Fayum. It formed the largest category of land in the two villages in the Fayum with detailed extant evidence, Tanis (240/239)[5] and Kerkeosiris (119/118). In the former it comprised 45% of the land (Monson 2012a, 91), and in the latter 52% of the land (Crawford 1971, 103; Monson 2012a, 92). Royal land in the Fayum is likely to have formed a greater proportion of the land than elsewhere in Egypt, since its reclamation in the mid-third-century meant it lacked the traditional tenure existing elsewhere, and its land use could be more easily determined by the state (Crawford 1971, 103). This is possibly indicated by the over-representation of the Roman successor to Ptolemaic Crown land, *dēmosia gē*, in the Fayum under Roman rule (Rowlandson 1985, 329-330 n 6). Even if crown peasants were in practice often tied to the land (Crawford 1971, 105), arrangements could be flexible, with the possibility of long and short term contracts with the state, and the leasing and conveyance of land to other parties (Rostovtzeff 1941, 277-280; Crawford 1971, 104; Manning 2010, 161; Monson 2012a 76-77). Based on the evidence from Edfu, in the Nile Valley Crown land was similar to private land (Manning 2003, 81).

Another important category was sacred land (*hiera gē*), held by the temples. Temples could lease their land in a variety of ways, even allowing tenants hereditary rights that could be sold to a third-party and which were therefore a form of private land-holding (Manning 2003, 50; Monson 2012a, 77). As mentioned in CHAPTER 2.1.5, these temple estates were important centres of land

[5] Monson (2012a, 90, n 81) states that the Egyptian village name *Ta-any* should be equated with the Greek Tanis, located in the Herakleides district, and no longer with Tebtunis. Tanis is mentioned several times in the Zēnōn papyri. Water was channelled through Tanis to Philadelphia (*PCZ* I 59072; *PCZ* I 59019; *PCZ* I 59256), and Zēnōn was involved with settling kleruchs there (*PCZ* II 59297; see Clarysse, 1980). For a review of the evidence see Uytterhoeven (2003).

administration, and also represented an element of local power. Clarysse (2010, 279-280) notes that although the king technically donated this land to the temples, the same donations were continuously renewed, suggesting his role had little real impact on land-holding. In the Fayum, sacred land seems to have been sparse (Monson 2012b, 9-10): below ten-percent at Kerkeosiris (Crawford 1971, 184-185; Monson 2012a, 92); it is unrecorded and was possibly absent at Tanis (Monson 2012a, 91-92; 2012b, 10). The predominance of archaeological, papyrological, and epigraphic evidence of the administration of this land comes from Upper Egypt (Kurth 1997, 152-153; on the temples of Upper Egypt and their relation to land tenure see in particular Manning 1999; 2003, 65-98, 182-225). It is difficult to know the extent of temple land in the Delta, and whether it resembled Upper Egypt or the Fayum. This relatively little new construction of temples during the Ptolemaic period in the Delta (Manning 2003, 69), in contrast with the great temple building programs in the south, such as that of Edfu, might provide a suggestion that temple land was less extensive in Lower Egypt.[6] One major area in which the Fayum and Delta are similar to each other, and different to the Nile Valley, is in the extent of marginal land. This might have played a part in the determining the customary use of land.

As mentioned, the reclamation of the Fayum allowed the state to determine the system of land-holding there to a greater extent than elsewhere (Crawford 1971, 103; Rowlandson 1985, 329). The link between state policy and the establishment of a non-Egyptian elite in Egypt, as discussed in CHAPTER 5.5, suggests that the state might have desired to control land more directly in the forms of crown and kleruchic land found commonly in the Fayum rather than granting much of this land to temples. The situation in the Fayum, therefore, was in this respect quite different to that in the Delta, where perhaps the existence of customary land-holding by the temples was more extensive.

[6] While the evidence and literature on temples of Upper Egypt is extensive, there is a paucity of evidence relating to the temples of Lower Egypt. See, for example, Grenier 1979. This does not mean that similar building did not take place in the Delta. The cause of this uneven representation of evidence might be later re-use or destruction in the north: Manning (2003, 69) notes the practice of burning limestone for its lime as possibly responsible for this. Temples in Lower and Middle Egypt were characteristically built with limestone, while those in Upper Egypt were constructed with sandstone (Clarysse 2010, 275).

Temple estates not only produced goods for their own consumption but were also engaged in the sale of products beyond the estate. This is implied in *P. Rev.* 51-52. Under the regulations recorded here, any oil produced in the temples was prohibited from being sold, a measure unnecessary unless this was an established practice. Indeed, the temples had to allow close inspection of their operations by the *telōnai*, *oikonomoi*, and *antigrapheis*, and were permitted only a short period of oil production per year, of only particular kinds of oil, purely for household consumption. I discuss this further below (CHAPTER 3.2). The existence of such strict measures suggests that state officials viewed the temples as potential competitors in the sale of goods produced in state controlled industries, which leads us to believe that temples had previously engaged in the production of these goods for the market themselves. In addition to oil, Clarysse (2010, 280) notes temples as important producers of papyrus and linen.

Kleruchic land was granted to military settlers as a means of payment to soldiers in kind (Rostovtzeff 1941, 284; Fischer-Bovet 2014, 199). These grants depended on military service, and during the 3rd century could not be inherited or sold, at least in theory, and in addition to this could be rescinded by the state (Rostovtzeff 1941, 285-287; Monson 2012a, 89). The presence of kleruchic land was significant in the Fayum, where at Tanis in the mid-3rd century it comprised 40% of the land, and where at Kerkeosiris in the late 2nd century it represented 34% of the land. Cavalry settlers were granted large, 100 *aroura* estates, which Clarysse and Thompson (2006/2, 241-6) note made up 20-25% of the cultivable area of the Fayum. Kleruchs were required to ensure that the land granted to them was brought under cultivation, which in the Fayum might have meant reclaiming marginal land (Clarysse 1979, 742).

The fact that kleruchic land grants were non-hereditary, and could be revoked by the state, lessened the development of a landed military aristocracy in the 3rd century. Despite that, since kleruchs did not themselves have to work the land, and as soldiers had close links with the state, we can consider them as part of a military elite. Since they were non-Egyptian for most of the 3rd century, we see a division between these military settlers and the general population (Lewis 1986, 26). Nevertheless, kleruchic plots were granted to foreigners from varying backgrounds, and not merely to Greeks

(Bagnall 1984, 7-20). Kleruchs did not necessarily cultivate this land themselves: many instead leased this land out to tenants (Rostovtzeff 1941, 285; Lewis 1986, 32). Kleruchic land, therefore, was not necessarily worked by non-Egyptians, despite the fact that under Ptolemy II and III Egyptians appear to have been refused military land grants (Crawford 1971, 69).

In addition to the forms of private land classified within the above fiscal categories, there was another explicit category of private land, *idioktetos gē*. As Manning (2003, 198-225) shows, the institutions relating to the recording and conveyance of private land continued to function in the Ptolemaic period, particularly in Upper Egypt. The earliest surviving evidence of Demotic leases in the Ptolemaic period comes from the early 2nd century (Manning 2003, 198) and so I do not attempt to apply them directly to my study. Nevertheless, as practices relating to the sale and lease of private land were based on pre-Ptolemaic institutions, and were retained within temples during the Ptolemaic period, these practices must have continued without a break.

In addition to these forms of land tenure, there were the gift-estates or *dōreai* granted to officials, presumably for the same reasons as land was granted to soldiers: as a form of salary. These consisted of 10,000 *aroura* grants, and were non-hereditary. The only ones about which have great detail are those of the *dioikētēs* Apollōnios, in particular his estate at Philadelphia in the Fayum, described throughout the Zēnōn papyri. Rostovtzeff (1922, 43) argued that the references to *dōreai* in the Revenue Laws papyrus demonstrate that they were common during the reign of Ptolemy II. Beyond these two sources, however, our evidence of *dōreai* is scant (Manning 2003, 112). As in the case of the kleruchies, land on these large estates was leased out, both to Greeks and to Egyptians (Manning 2003, 114).

The regional differences in the forms of land tenure should make us wary of applying evidence of conditions in the Fayum to Egypt as a whole (Rowlandson 1985, 329). This makes discussion of the 3rd century economy problematic, since the majority of the papyri comes from the Fayum. This is especially difficult in discussing the overall economic policy, as the arrangement of land tenure in the Fayum probably facilitated state influence over the economy. Despite this, there is some indication

that certain aspects applied across Egypt. In the Revenue Laws papyrus (*P. Rev.*, col 31), for example, we have a list of several nomes where the measures were to apply, according to the different values of the product in each region. This list includes nomes of Lower and Upper Egypt, as well as specifically mentioning the Thebaid as a single unit. This would suggest that the system of tax-farming contracts and related state actions, Turner's (1984, 151-153) Model II (see CHAPTER 1.3 and above), prevailed across the country as a whole.

The reclamation of the Fayum under Ptolemy II was itself an important part of economic policy, allowing for an increase in the cultivable land, and of the resources of the realm (Manning 2003, 124-125; Monson 2012a, 276-277). This required a large-scale mobilization of labour and capital goods (Thompson 1999a, 110-113; Manning 2003, 105), made possible through the wealth of the state and the influence it had over the economic resources of the country, including *corvée* labour. The expansion of agricultural production accompanying this represents an example of the state's control of resources facilitating large-scale and long-term investments. It also made possible the introduction of new crops and forms of agriculture on this newly settled land (Thompson 1984, 366-369; 1999b, 123-137).

Connected with land tenure was the *diagraphē tou sporou* or sowing schedule. Through this, the state determined which crops were to be cultivated, certainly on crown land and possibly on other forms of land tenure (Crawford 1971, 25; Manning 2003, 153). Kleruchic land, however, seems to have been generally exempt from the schedule (Rostovtzeff 1941, 285; Crawford 1971, 26). Seeds were loaned to the cultivators and collected again at harvest, to be stored in state granaries (Préaux 1939, 119-120; Turner 1984, 150; von Reden 2007, 205-210). Although Rostovtzeff (1941, 279-280) saw it as part of a planned economy, *P. Yale* I 36 demonstrates that the schedule was prepared locally and sent to the office of the *dioikētēs* for approval (Vidal-Naquet 1967, 20-24). The sowing schedule meant that the state controlled the capital goods required for cultivation, most importantly the seeds, and influenced the crops grown, even if this was managed by the local administration. As Vidal-Naquet (1967), Pikous (1970, 405-410), Bingen (1978a, 179) and Turner (1984, 149-150) argue, the sowing schedule seems to have been borrowed from traditional economic institutions. This accords with the general

picture of land tenure outlined above and the origin of the harvest tax (Vandorpe 2006, 168), discussed below (CHAPTER 3.1.3). The interplay between the office of the *dioikētēs* and the local administration is demonstrated in the responsibility of both the *oikonomos* and nomarch for the sowing of land (*P. Tebt.* III.I 703, 57-60; *P. Rev.*, cols. 41-43). Each was personally liable, and the nomarch had the right to punish negligent peasants who failed to sow the seeds as ordered (*P. Rev.*, col. 43).

3.1.2 ECONOMIC POLICY IN THE WESTERN OASES

Although land tenure in the Fayum and in the Nile Valley have been studied extensively, relatively little attention has been given to the western oases, Khargeh and Dakhleh; an important exception is Gill (2014). In the Ptolemaic period, the two oases were known collectively as the Southern Oasis (Kaper 1992, 119-120; Gill 2014, 130). The city of Hibis in the Khargeh Oasis appears to have been a nome capital in the Ptolemaic period (Wagner 1987, 142-143). The agricultural potential of the region was recognized and exploited by the Persians, who built qanats to channel the water supply in Khargeh (Chauveau 2006, 157-163). A recent study of the archaeological remains at Dakhleh, based on the survey of the oasis by the Dakhleh Oasis Project, was undertaken by Gill (2014). Gill (2014, 143-161) argues that the Ptolemies developed Khargeh and Dakhleh in a similar vein to that of the Fayum. He identified the foundation of new settlements within Dakhleh Oasis, with a 106% increase in the total number of documented sites from the Late Period to the Ptolemaic period. Seventy-five percent of these sites lack evidence of occupation prior to Ptolemaic times (Gill 2014, 145). That the state controlled the region is confirmed by royal promotion of the two major temples in Dakhleh: the temple of Seth in the capital, Mothis, and the temple of Thoth in ancient Trimithis. Excavations in the temple of Seth at Mut, carried out by the Monash University team under the direction of Colin A. Hope, have yielded dozens of ostraka written in Demotic dated to the Ptolemaic period, mostly from the reign of Ptolemy VIII, and hundreds that date to the Late Period. From the extant remains of the temple, Hope has calculated that it was, in fact, larger than that of Hibis (personal communication,

August 2015). The New York University excavations at Amheida, ancient Trimithis, under the direction of Roger Bagnall, are proving equally fruitful. The 2015 field season report includes the discovery of temple blocks dated to Dareios I, with a similar inscription to that at Hibis (http://www.amheida.org/inc/pdf/Report2015.pdf). Other inscriptions indicate extensive temple patronage in Dakhleh under the Saite kings (Kaper 2012, 167-173). The expansion of settlement in the oases may well have been a state policy paralleling that of the Fayum. Here I consider land tenure there and note further links with economic policy.

The temple of Hibis in Khargeh Oasis, established during the Persian period (Winlock 1941, 7-9), was expanded by Ptolemy II. A Greek inscription there states that an official under Ptolemy II constructed a girdle wall and gateways (Winlock 1941, 49-50). Building also took place under Ptolemy III, with cartouches of both his and his wife Berenikē's name written on blocks (Winlock 1941, 39). Ptolemy III also built at Qasr el-Ghueita in Khargeh Oasis. An inscription claims that this was done 'in order to direct divine offerings to Thebes, for his father' (Darnell, Klotz, and Manassa 2013, 31). This implies a link between the temple and agricultural production, as well as a connection with the state in the distribution of this produce. The importance of these temples, demonstrated by this building activity and the status of Hibis as an administrative centre (Gill 2014, 133), suggests that the land tenure of the oases might have been dominated by the temples. As in the Nile Valley, the state no doubt supported these temples as a means of local administration. The western oases lay on an important trade route, as noted by Manning (2010, 106-107), and so the establishment of a presence in the oases could transfer into control over the movement and taxation of goods.

Wine was a major product of the western oases, just as it had been in earlier times (Giddy 1987, 84, 89), and continued to be during the Roman period (Strabo 17.1.42; Bagnall 1997b, 45). Frequent references to dedications of wine in ostraka from Dakhleh Oasis (Vittmann 2012, 23) prove the continued and widespread cultivation of vines during the Ptolemaic period. References to oasis wine in temple offering scenes in the Nile Valley, for example at Edfu, Dendera, and Kom Ombo (Poo 1995, 94-117; Gill 2014, 15), demonstrate that this wine was in demand beyond the oases. This is suggestive of an extensive viticulture industry there. Olive trees were also cultivated in the oases

during the Ptolemaic period, attested in unpublished Demotic ostraka from Mut (18/76; 22/83; 22/95). This is particularly notable, as evidence for olive cultivation in the Ptolemaic period is meagre (Thompson 1999b, 132); their cultivation in the oases demonstrates the agricultural and economic potential of the year-round supply of water available there. If the *apomoira* tax, levied on orchards and vineyards, was auctioned off to tax-farmers in coin as elsewhere in Egypt (see CHAPTER 3.1.3-3.1.5), we can expect that this would have provided commercial opportunities for Greeks with capital, attracting them to the oases (on tax-farmers as Greeks see Rostovtzeff 1941, 330-331; Lewis 1986, 16-20; von Reden 2007, 107; Manning 2010, 155).

The oases were also a source of alum, certainly exploited during the New Kingdom and in the Roman period (Lucas and Harris 1989 [1962], 257-259; Giddy 1987, 88). Préaux (1939, 253) argued that since all other minerals were controlled by the state, alum must have been under a similar monopoly. If that was the case, the tax on alum would have been sold off to tax-farmers in coin (see CHAPTER 3.1.5 on tax-farming contracts). Just as with viticulture, this would have created opportunities for moneyed Greeks in the oases. Finds of Ptolemaic coinage at Khargeh (Newell 1941, 51-55; Gill 2014, 148) and at Dakhleh (Bowen personal communication, September 2015) demonstrate that the oases were influenced by economic developments occurring elsewhere in Egypt. Gill (2014, 147) argues that the sole presence of Ptolemaic coins in the oases is suggestive of the incorporation of the oases into the closed currency system established by Ptolemy I (see CHAPTER 3.1.8).

Further evidence of Ptolemaic monetary developments in the oases is indicated by an unpublished ostrakon from Mut (18/33). Dating to 120/119, it refers to the payment of bronze drachmas into a bank:

1. ἔτους ν Θωυθ
2. τέτ [(ακται) εἰς] τὴν ἐν Ὀάσει
3. τρα(πέζαν) ἐφ᾽ ἧ[ς…]$^{\omega(\ )}$ οἴνου πρ(ὸς) Ὄσιριν
4. μθ (ἔτους) Ἀρποῦνσις Ψεννμ

5. εἰς τὸν τοῦ τρα(πεζίτου) λόγον

6. χαλκοῦ χ(ιλίας)$^{\alpha}$, λίνου ὁμο(ίως)

7. μθ (ἔτους) ρι, (γίν.) χιλίας ρι.

Year 50, Thoth;

Has paid into the bank in

the Oasis under...o(n) for wine to Osiris

for year 49 Harpounsis s.o. Psenn()m()

into the banker's account

of bronze 1000 (dr.), for linen

likewise for year 49, 110 (dr.) in sum, (1) thousand 110.

(Mut Ostrakon 18/33, trans. K. A. Worp)

This is the only attestation of a bank 'in the Oasis'. It demonstrates that monetary institutions developed under the Ptolemies were operating in the oases, adding support to the supposition that economic activity in the region provided opportunities for tax-farmers.

Graffiti from the temple of Qasr el-Ghueita in Khargeh Oasis prove the presence of Greeks in the southern oases in the early Ptolemaic period. These fragmentary texts were collected, edited, and published by Wagner (1987, 21-26). Thirteen of these graffiti include Greek names (4-8, 10-13, 15). Patronymics and the individuals' places of origin could still be read for many of them. Wagner (1987, 21) argues for a firm 3rd or 2nd century date for all of these, suggesting an even more precise date of the 3rd century for Graffiti 6 and 7. This is presented in TABLE 1.

TABLE 1. Individuals' names and origins as recorded in Greek inscriptions from the temple of Qasr el-Ghueita, Khargeh Oasis, 3rd-2nd centuries (Wagner 1987, 21-26).

Graffito No.	Name and Patronymic	Origin	Suggested Date
4	Zenōn	Unknown	3rd or 2nd century
5	Theophilos, son of Satyriōn	Megarean	3rd or 2nd century
6	Alexandros, son of Perigenēs	Macedonian	3rd century
7	…olykos, son of Eutychidēs	Xanthian	3rd century
8	Hieroklēs, son of Philoxenos	Unknown	3rd or 2nd century
10	Eumelos, son of Diōn	Chalkidean	3rd or 2nd century
11	Xenōn, son of Eumelos	Chalkidean	3rd or 2nd century
12	Lykōn	Lykian	3rd or 2nd century
13	Philoxenos	Unknown	3rd or 2nd century
15	Timodamos	Unknown	3rd or 2nd century

We can be confident that these individuals were Greeks, Macedonians or Lykians rather than Egyptians taking Greek names, since origins are attested for many of them, and because in the Ptolemaic period, the evidence for Egyptians with Greek names is sparse (Peremans 1970, 38; Johnson 1987, 146-147). To this data, we can add a graffito from the temple of Hibis, recording one

Jason the Berenikēan, son of Alexandros, also dated to the early Ptolemaic period (Winlock 1941, 52). From this small sample size, we see a limited variety of origins. It might be wondered what these Greeks were doing in Khargeh Oasis. Opportunities for Greeks in Ptolemaic Egypt included administrative posts, tax-farming contracts, and military service (Bagnall 1984, 19; Lewis 1986, 15-26). We might, therefore, suppose that the Greeks present at Khargeh served in one or more of those capacities. Wagner (1987, 224) suggested they might have been kleruchs. The place-names attested as origins of the Greeks at Qasr el-Ghueita are known for the origins of kleruchs settled elsewhere in Egypt (Bagnall 1984, 10-12), and there is nothing peculiar about them. As with kleruchs generally (Bagnall 1984, 14-15), most of the known origins of the men at Khargeh come from outside of Ptolemaic territory. Graffiti 7 and 12 (Wagner 1987, 23-25) represent the exceptions. The increase in cultivated area in the oases, as argued by Gill (2014, 145-147), might add weight to this attribution. Although the bulk of evidence on kleruchic settlements concerns the Fayum, kleruchs were also settled further south, in the Nile Valley (Fischer-Bovet 2014, 203-204). Vandorpe (2006, 168) sees the temple-building and kleruchic settlement in Edfu during the 3rd century as the creation of a small royal bastion in a region where temples were responsible for local administration. The temple-building and expansion of settlement in the oases might suggest that similar developments occurred there.

The evidence of Ptolemaic settlement, even during the first century of rule, combined with our extensive knowledge of the goals and undertaking of the reclamation of the Fayum, suggests that the oases were likely developed by the Ptolemies in the same way as the Fayum. The steady access to water year-round allowed for the expansion of certain types of cultivation less suitable in other parts of Egypt. The large-scale production of wine, long undertaken in the oases, was facilitated in the Fayum by the reclamation of land (Rostovtzeff 1941, 353-354; Thompson 1999b 133-134) and so it seems reasonable that the state would also want to foster and profit from its production in the oases. One difference with the Fayum was probably in the extent and influence of the temple estates. I noted in CHAPTER 3.1.1 that the evidence for large land-holdings by these in the Fayum is sparse, while the

picture we get from temple building in the oases is that they were important administrative centres (Gill 2014, 149).

The oases are on the periphery of Egypt and are part of the chain that formed an important caravan route, which offers an alternative to the Valley, and links sub-Saharan Africa with the Mediterranean, via the Farafra, Bahriyah and Siwa Oases. This route was used by the Egyptians in times of strife when the Nile was inaccessible (*The Autobiography of Harkhuf* in Lichtheim, 23-27; *Inscription of Kamose*, 18-19 in Redford 1997, 14). By establishing kleruchies, the oases would have functioned as a military buffer zone, as argued by Gill (2014, 155-159).

3.1.3 TAXATION IN KIND

Since the chief economic activities that occupied most of the population of Egypt were agricultural, taxation in kind was a considerable source of state revenue (Rostovtzeff 1941, 290; Manning 2003, 57). The most important taxes on agricultural production were the grain tax and the *apomoira*. Grain (predominantly emmer and barley) was not only the most widely grown crop in Egypt, it was also a significant export product (Rostovtzeff 1941, 359, 381, 393; Casson 1954, 168; Fraser 1972/1, 165), and was used within Egypt for loans (von Reden 2007, 151-152) and in the payment of wages (von Reden 2007, 138). The state attempted to ensure the appropriate planting of seeds and assessing of the crop (*P. Tebt.* III.I 703, 49-57), as well as an effective collection of the harvest tax (*epigraphē)*. The Karnak ostrakon (*O. dem. Karnak* LS 462.4; Burstein 1985: 97) records that a survey of all cultivation in Egypt was undertaken under Ptolemy II, including the calculation of all taxes on agriculture.[7]

Here I briefly outline the taxes and rents owed to the state for land use. I categorize these taxes and rents together because of the interchangeability of the harvest tax (*epigraphē* or *shemu*) and rents

[7] Chauveau (2003, 6) argues, however, that the king's name on the ostrakon should be read as Psammetikhos I, rather than the previously accepted Ptolemy II.

(*phoros* or *ekphorion*) in the records, which were not necessarily distinguished from each other in Ptolemaic Egypt (Monson 2012a, 166-167). This taxation fell into two categories: taxes on a portion of production, and fixed taxes on land. In the former category there were harvests tax on grain land, and on orchards and vineyards (the *apomoira*). The general harvest tax was applied to agricultural production on Crown land, at a rate on average of four or five artabas per *aroura* (Vandorpe 2000, 172). This has long been recognized as representing about half the annual yield (Préaux 1939, 134; Rostovtzeff 1941, 179; Rowlandson 1985, 328; Manning 2003, 123; Monson 2012a, 172), and was therefore a significant form of revenue in kind, paid into royal granaries. It is attested at least as early the New Kingdom (Vandorpe 2006, 168). Vandorpe (2000; 2006, 168) argues that at the end of the 3rd century in the Thebaid, the state began to collect the harvest tax, which was formerly paid directly to temples. The lack of evidence for this before 223 suggests that under Ptolemy II and for most of the reign of Ptolemy III, temples collected the harvest tax and the state only collected a land tax and the *apomoira* from them.

The *apomoira* or 'portion' tax was levied on the first fruits of orchards and vineyards, reckoned in money, though in theory it was collected in kind when applied to vineyards (Clarysse and Vandorpe 1998, 26; Vandorpe 2006, 166; von Reden 2007, 95-96). It appears first in *P. Rev*., cols. 36-37 for the year 263, the same year for which the first salt tax receipt is attested (Muhs 2005, 8; Clarysse and Thompson 2006/2, 39). The *apomoira* stood at 1/6th of annual production, although concessions were given in certain cases, notably on kleruchic and temple land, which were taxed at the lower rate of 1/10th of annual production (*P. Rev.*, col. 24; Clarysse and Vandorpe 1998, 23-26; von Reden 2007, 96-97). The means of collecting the *apomoira* through tax-farmers is detailed in *P. Rev.*, cols. 1-37, and I expand on this in the discussion below. The collection of the *apomoira* was underwritten by tax-farmers who had purchased, at auction, the right to receive the proceeds of taxation, with their bids going to the state as revenue (see CHAPTER 3.1.5 and 3.2 on tax-farmers).

Another form of land taxation was a fixed tax on the area of land used. As in the case of the taxes on the portions of production, it was applied to both regular arable land, where it was called the *artabeia* and that of vineyards and orchards (the *eparourion*). This fixed rate of taxation was low relative to

the harvest tax, levied at only one-half, one, or two artabas per *aroura* (Vandorpe 2006, 167). This lower rate land-tax was applied to kleruchic and temple land (Vandorpe 2000, 175; 2006, 167) suggesting it implied a privileged status (Monson 2012a, 173), much like the reduced rate of the *apomoira*.

3.1.4 TAXATION IN COIN

All taxes in Ptolemaic Egypt, apart from those on oil-producing plants and those on land and the harvest mentioned above, were monetary ones (von Reden 2007, 84). Even the *apomoira*, which was collected in kind, was converted into cash before being paid to the temples (von Reden 2007, 95-96). I briefly outline some important monetary taxes as the basis of further discussion in the following chapters. The salt tax was an important example. Its initial rate was one and a half drachmas for men and one drachma for women (for salt tax rates see Muhs 2005, 10; Clarysse and Thompson 2006/2, 45). In 254, this was modified to one drachma for men and three obols for women. The salt tax appears to have been introduced as a replacement of the yoke tax, which, like the salt tax, was possibly a kind of capitation tax, and disappears from records at the same time as the salt tax enters into them (Muhs 2005, 31).

Although the rate of the salt tax was much reduced from that of the yoke tax, which stood at eight drachmas, it was levied on both men and women, while only men had to pay the yoke tax, likely as representatives of the household (Muhs 2005, 6). The collection of the tax was organized through the taking of a census that recorded those required to pay it (Clarysse and Thompson 2006/2, 40).[8] Exemptions were given, initially for those in occupations associated with Greek culture (*P. Hal.*, 260-265), but then extended to certain priests, doctors, guards and policemen, particularly after the reign of Ptolemy III (Clarysse and Thompson 2006/2, 88). Compulsory labour was also owed to the state. This was measured in the amount of earth that was required to be moved, for example in working on dikes or canals. This duty, however, was not necessarily fulfilled in actual labour, and could be

[8] Surviving examples of salt-tax records are collected in Clarysse and Thompson (2006/1).

substituted with payment to the state in coin (von Reden 2007, 136). In other cases, the salt tax could be paid for in labour services (von Reden 2007, 277-278), suggesting that these two compulsory duties were sometimes interchangeable.

Based on a population numbering between two and seven million, Muhs (2005, 10) has estimated the revenues generated by the salt tax at the original rate under Ptolemy II as amounting between 625 and 1460 talents of silver. To put this into perspective, Herodotos (3.91) reports the annual tribute paid by Egypt and Kyrēnaika to Dareios I as 700 Babylonian talents (equivalent to 833 Attic/Euboian talents) of silver (plus tribute in kind). This is comparable to Muhs' (2005, 10) figure for the revenues of the salt tax, which perhaps bolsters its validity. The salt tax and the duty of compulsory labour combined, therefore, imposed around a month's worth of labour upon those taxed: Muhs (2005, 10) estimates between 25 and 39 days for the initial rate, and between 19 and 33 days for the 254 rate.[9] The reduction in the salt tax rate across time is notable, and perhaps indicates a difficulty in collection (Clarysse and Thompson 2006/2, 46).

This reduction in the rate at which the salt tax was collected, however, seems to have been accompanied by the raising of other taxes (Clarysse and Thompson 2006/2, 51, 70-71). One tax with a broad base was the *ennomion* or pasture tax, which stood at one obol per animal. It was associated with the salt tax (Muhs 2005, 60) and noted in *P. Tebt.* III.I 703 for its significance, suggesting that it was an important source of revenue. Thompson (2011, 392) argues that the raising of livestock was just as important to the livelihoods of kleruchs as agriculture: the prevalence of kleruchies in the Fayum might explain the emphasis placed on the *ennomion* in *P. Tebt.* III.I 703. There were a number of taxes in addition to this, including the obol tax (*obolos*), the guard tax (*phylakitikon*), the police-tax (*rhabdophorikon*) and, importantly, the collection of a tax to engage in trade (Clarysse and Thompson 2006/2, 51, 70-74).

[9] These calculations are based on a wage of one obol per day. This is the equivalent of six and nine days' work for a man and woman respectively at the first rate, the equivalent of six and three days' work at the 254 rate, and the equivalent of four and one and a half days' work at the 243 rate. As Clarysse and Thompson (2006/2, 46-47) note, this results in a household paying about half a month's wages per year towards the salt tax.

As a final note on taxation, Manning (2003, 135 n 21) views the revenues of the Ptolemaic state in coin alone as falling somewhere between 14% and 21% of the GDP of Egypt, with revenue in kind amounting to at least a further 500 talents. This represents about double the revenue to GDP ratio of that within the Roman Empire (Manning 2010, 127), and demonstrates the significance of the Ptolemaic state as an economic actor.

3.1.5 THE SYSTEM OF CONTRACTS (*ŌNAI*)

Economic activity beyond the growing of crops usually included the auctioning of special contracts, granting rights to receive an amount of production or taxation from these industries. Turner (1984, 149-152) called this Model II of the economy, distinguished from the legal, social, and traditional obligations of Model I, which were concerned with the surveying and use of land and the economy in kind. The documents that record the regulations relating to these contracts most extensively are *P. Rev.* and *UPZ* I 112. Officials of the regular administration were explicitly barred from purchasing these tax-farming contracts (*P. Rev.*, col. 15). The contracted parties were known as *telōnai*. This term has been rendered as 'tax-farmers', though since these agents played a variety of roles and did not collect taxes, the term can be misleading. The collection of taxes itself was undertaken by *logeutai* (Thompson 2001b, 1262; Clarysse and Thompson 2006/2, 76-77), under the direction of the *oikonomos*. The *telōnai* bought the right to receive taxes on economic activities, paying for it upfront to the state in coin. Through this, they guaranteed a certain amount of monetary revenue to the state, from which budgets could be made in advance (Rostovtzeff 1941, 328; von Reden 2007, 106-107). This enabled a steady revenue stream and reduced risks caused by changes in conditions year-to-year (Préaux 1939. 450; Bingen 1978a, 166-167; Manning 2003, 142; 2010, 155). It also allowed the state to base its budgets on coin in an agrarian economy, where direct taxation would have to be levied in kind or through *corvée* labour (Préaux 1954, 322-323; Clarysse and Thompson 2006/2, 33-34; Thompson 2008, 29; Manning 2010, 128). It was, therefore, a means of partially monetizing state finances. The basic structure and terminology of these contracts were borrowed from earlier Greek

practice (Préaux 1939, 450-451; Rostovtzeff 1941, 328; Bingen 1978a, 166; Manning 2010, 152-153), though their roles of the *telōnai* differed from this in important respects, for example in the fact that tax-farmers did not collect taxes. The movement of funds, including collected taxes and the sureties paid by the *telōnai*, was managed on the local level by royal banks, under the supervision of the *oikonomos* (Bogaert 1998-1999, 77-89; von Reden 2007, 268-273).

P. Tebt. I 5, lines 168-177 gives a brief list of some of the important industries of which taxes were farmed out to *telōnai*: weaving, cloth-making, pig and goose raising, vegetable oil production, bee-keeping, and brewing. The exclusive rights to produce and sell beer is attested elsewhere (e.g. *PCZ* II 59199, *PMZ* 3102; see Rostovtzeff 1922, 118-119; 1941, 308-309; Préaux 1939, 152-158); Clarysse and Thompson (2006/2, 199) note that just one or two families in each village were involved in this industry. State control over the vegetable oil and textile industries is attested in *P. Rev.* and *P. Tebt.* III.I 703, 87-164 (on the latter see Préaux 1939, 95-116; Rostovtzeff 1941, 305-308). Further examples of tax-farming contracts appear in relation to the *apomoira* or 'first-fruits' tax on orchards and vineyards (*P. Rev.*, cols. 1-38), fishing (*P. Tebt.* III.I 701; *P. Tebt.* III.I 723), and the production of honey (*P. Tebt.* I 5, 173; *PSI* V 510). As mentioned, the *apomoira* was normally taxed at a rate of $1/6^{th}$ of the annual production, but at a reduced rate of $1/10^{th}$ of annual production for kleruchs and some temples (*P. Rev.*, col. 24). On these other industries, it appears that 25% of production (*tetartē*) was owed to the state (Heichelheim 1970 [1938], 191; Rostovtzeff 1941, 296-297). We see the same rate in regard to the oil monopoly, with the *telōnai* collecting 25% of the produce (*P. Rev.*, cols. 39-40; see Bingen 1978a, 174-175), and on baking and pickled fish in the Fayum (*P. Petr.* III 117 H, 3, 18, 23, 25, 30).

Another aspect of these industrial monopolies was state control over the prices of goods. This seems to have only existed in relation to these industrial *ōnai* where production was under firmer state control, and not those for which the *telōnai* served a purely tax-farming role. Honey, for example, seems to have been sold according to market, rather than fixed, prices (Rostovtzeff 1941, 296; Bingen

1978b, 221).[10] Indeed, *P. Tebt.* III.I 703 lines 175-180 attest to the fact that some prices were set by the state while others were not so fixed. In relation to the oil monopoly, the prices of the finished product were strictly set by the state (*P. Rev.*, col. 40). To regulate this more effectively, the state separated the parties producing the good and those selling it, controlling this retailing through the *oikonomoi* as intermediaries (*P. Rev.*, cols. 54-55). I discuss this and other aspects of the vegetable oil monopoly in CHAPTER 3.2.

3.1.6 STATE CONTROL OVER EXTERNAL TRADE

Specific discussion of Ptolemaic trade policy has been undertaken by Andréadès (1932), Préaux (1939, 371-379), Rostovtzeff (1932; 1941, 381-398), Fraser (1972/1, 148-188), and Sijpesteijn (1987, 1-2). Despite the reconstructions of this policy presented in those works, we must realize that the evidence for the relationship between the state and foreign trade is very scant. The key pieces of information come in the form of personal records of payments of customs duties from the Zēnōn papyri, most importantly *PCZ* I 59012, and the regulations relating to the importation of vegetable oil recorded in *P. Rev*. We lack sufficient evidence to confirm the existence of a general export tax (Andréadès 1932, 36-37; Fraser 1972/1, 156), though this could be suggested in *P. Lond.* VII 1979 (Sijpesteijn 1987, 2), and a toll is attested on the export of slaves to Gaza (*PCZ* I 59093; V 59084).

Trade interests with the south and east are demonstrated by the foundations of settlements along the Red Sea coast under Ptolemy II, as recorded on the Pithom Stela (Mueller 2006, 192-199) and by Strabo (16.1.4-14). In connection to this, we can point to the canal re-cut by Ptolemy II, enabling traffic from there to reach the Nile (Diodoros 1.33.11; Strabo 17.1.25).[11] Road networks and way stations were also established between the Nile and the Red Sea (Strabo 17.1.45), further demonstrating the Ptolemies' desire to facilitate the movement of traffic and access to gold mines in

[10] On the buying and selling of honey see *PSI* IV 428, V 510, V 512, V 524, and V 535.

[11] The Pithom Stela (10) also mentions this canal (Tarn 1929, 9; Redmount 1995, 128), and notes (19) '1260 *deben* and 6 *kite* from the revenues of the canal of the east'. This might refer to duties taken on Red Sea trade.

this region (Murray and Warmington 1967, 28-32; Manning 2010, 106-107; Sidebotham 2011, 28-31). We have little evidence from the early Ptolemaic period on the nature of commerce in these Red Sea ports. Rhodian and Phoenician amphorae likely indicate the importation of wine and oil (Sidebotham 2011, 32), though whether these came via Alexandria is impossible to tell. The monsoon winds of the Indian Ocean were not employed regularly by merchant ships trading with Egypt until the end of the 2nd century at the earliest (Sidebotham 2011, 35); trade from the Red Sea ports expanded in the late Ptolemaic and Roman periods (Tomber 2012, 203). It seems that trade in the early Ptolemaic period was focused on the Mediterranean, occasioned by links with the Greek world and the kingdom's economic and political centre at Alexandria. Nevertheless, the Red Sea ports facilitated the importation of elephants from East Africa; their role in the elephant trade is perhaps suggested by the discovery of part of an elephant tooth within a possible pen at Berenikē (Sidebotham 2011, 32). Special expeditions for the acquisition of elephants were sent south into Ethiopia (Scullard 1974, 126-137; Préaux 1978, 34-37; Burstein 1996; 2008, 136-147; Mueller 2006, 151-157; Sidebotham 2011, 39-53; Manning 2011, 309-315). Both Agatharkhidēs (1) and the Adoulis Inscription (*OGIS* 54) state that the first of these occurred under Ptolemy II. *P. Eleph.* 29 (Bagnall and Derow 2004: 120) records the payment of elephant-hunters from a royal bank, demonstrating the role of the state in contracting for imports.

To return to trade policy in general, its central features in relation to importation were the levying of customs duties, and prohibitions on particular goods. We can also see from some measures attested in *P. Rev.* and *PCZ* I 59015-R that the organization of trade was possibly based on the same lines as the economy in general, with monopoly contracts sold off by the state. I discuss this below. In relation to customs duties, our clearest evidence is found in *PCZ* I 59012, 59013 and 59014.[12] The first is a private record of customs duties paid at Pelusion for the goods of Apollōnios and two other men. Since it gives the specific rates charged, it is of particular importance in attempting to reconstruct this policy. The origin of the shipment was Syria, though it is clear this was not the ultimate origin of many of the goods shipped. TABLE 2 presents the most important part of this document for my

[12] The first six lines of *PCZ* I 59014 were originally published in *PSI* VII 867.

purposes based on the text of Edgar (1925/1, 21-27; see also Andréadès 1932, 17-18; Préaux 1939, 373-374; Orrieux 1983, 56-58; Austin 2006, 531-535; Bresson 2012, 72-74).

TABLE 2. The principal goods recorded as imported in *PCZ* I 59012, dated to 259.

Goods	**Estimated Value**	**Unit of Measurement**	**Rate of duty *ad valorem***
glykys[13]	12 drachmas	*keramion*	50%
sestos	12 drachmas	*keramion*	50%
oxos	3 drachmas	*keramion*	50%
White oil	30 drachmas	*hemikadion*	50%
Khian jars of wine[14]	18 drachmas	*keramion*	33 1/3 %
Thasian jars of wine	20 drachmas	*keramion*	33 1/3 %
Figs	8 drachmas	*keramion*	33 1/3 %
Theangelian honey[15]	12 drachmas	*hemikadion*	25%
Rhodian honey	12 drachmas	*hemikadion*	25%
Lykian honey	12 drachmas	*hemikadion*	25%

[13] For discussion on the goods where the Greek names have here been retained, see Andréadès (1932, 14-16) and Bresson (2012, 81-86).

[14] The end of the word *kh-* is broken off and so it is not necessarily clear whether this means 'wine produced in Khios' or 'wine in Khian measurement' (*PCZ* I 59012, col. 1, 17). In line 19 we clearly read *thasia*, referring to the type of jar in which the wine is transported, also mentioned in *PCZ* I 59013, 5 and *PSI* VII 867, 2. In line 36, however, we have cheese '*khiou*', implying Khios as the origin.

[15] From Theangela, a city in Karia; in relation to the various types of honey, the adjectives here refer to the honeys themselves rather than to the containers in which they were imported.

Attic honey	20 drachmas	*stamnos*	25%
hypogastria	20 drachmas	*bikion*	25%
tarichos	20 drachmas	*bikion*	25%
Tuna	16 drachmas	-	25%
sphēneus	12 drachmas	-	25%
Boar meat	2 drachmas	*saloussion*	25%
Samian earth	10 drachmas	*stamnos*	25%
Pontic nuts	6 obols	*artaba*	25%
Venison	3 drachmas	*keramion*	25%
Goat meat	2 drachmas	*vanotion*	25%
Hard sponges	8 drachmas	*phormos*	25%
Soft sponges	12 drachmas	*phormos*	25%
Khian cheese	5 drachmas	*stamnos*	25%
Washed Wool	-	*kybotos*	20%

We see here a record of the importation of generally small amounts of consumption goods, mainly to be eaten or drunk. The tariff rates were between 20% and 50% *ad valorem*, with a 25% rate on most goods in this example. These customs duties were very high by historical standards, but not out of line with the tax rates of the Ptolemaic economy overall. Additional charges are attested in lines 74-76: the *diapylion* (about 3% of the cargo's value, although not necessarily based on it), the 1% tax, and the *triērarkhēma*, costing only one-and-a-half obols.

As for customs duties at points of entries apart from Alexandria and Pelusion, we know nothing. The Red Sea port of Leukē Komē on the Arabian coast is said to have levied, in the late 1st century CE, a duty of 25% *ad valorem* on the importation of goods (*Periplus Maris Erythraei* 19). This high rate, similar to the Ptolemaic ones and very different to the 2-5% *ad valorem* internal rates of the Roman Empire (see the TABLE 7 in CHAPTER 4.1) was suggested by Rostovtzeff (1908, 306-307) to have had

Ptolemaic origins. But this supposition, and even the existence of this 25% duty, has been questioned (Wallace 1938, 256; Sidebotham 1986, 106-107), and due to the lack of clear evidence we cannot firmly establish such a connection. I discuss the effects of these tariffs and the implications for understanding Ptolemaic policy in CHAPTER 4.1 and CHAPTER 5.1 respectively.

PCZ I 59012 demonstrates, therefore, that at least a degree of importation was permitted, despite high customs duties. Scholars have emphasized these customs duties in their discussions of Ptolemaic trade policy, seeing them as the general rule and affecting importation by merchants (Andréadès 1932, 19; Rostovtzeff 1932, 748, 768; 1941, 385; Préaux 1939, 371-379; 1947, 58; 1954, 322; Orrieux 1983, 55-56; Fraser 1972/1, 150; Sidebotham 1986, 9-1; 2011, 34; Sijpesteijn 1987, 1-2). In relation to the importation of vegetable oils, we see that the state attempted to prohibit completely the unlicensed importation of foreign oil into Egypt for sale (*P. Rev.*, col. 52). The penalty for this was the confiscation of the oil and a fine of 100 drachmas per *metrētēs* of oil. This policy is clearly in line with the general control of the oil industry (see CHAPTER 3.2). This is supported by the fact that despite these prohibitions, *P. Rev.*, col. 52 does make provisions for the importation of oil for sale in Egypt.

Merchants were permitted to carry oil classed as foreign or Syrian from Pelusion to Alexandria, but required documentation to prove their status. This means that foreign and Syrian oil was being imported into Pelusion, as well as to Alexandria, likely directly and indirectly. Since its transportation is here connected with licensed merchants, and there were prohibitions on the importation of foreign oil in general, it seems that commercial importation of goods was undertaken by specially contracted merchants. This is in line with state contracting within the economy overall, and is also suggested by the activities described in *PCZ* I 59015-R, discussed below. It is also of note that Alexandria and Pelusion were the locus of these special arrangements for the transportation of vegetable oil, suggesting these cities had a privileged status for importation (Sijpesteijn 1987, 4). Consistent with the setting of Pelusion in *PCZ* I 59012, they are mentioned as the only two points of entry for importers of oil (*P. Rev.*, col. 52). In addition to this, Alexandria and Pelusion appear to have been locations of state storehouses of oil, into which Syrian oil was imported (*P. Rev.*, col. 54).

It appears, therefore, that the Ptolemies shifted the centres of trade between Egypt and the Mediterranean to Alexandria and Pelusion. Diodoros (1.19) mentions that Thōnis (Herakleion-Thōnis in the Ptolemaic period) had been the trading port of Egypt in early times. The city fell into decline in the Roman period (Goddio 2007, 75). There is much evidence of habitation during the 3rd century (Goddio 2007, 105), and Carbon-14 dating has placed at least three shipwrecks certainly in the Ptolemaic period (Goddio 2007, 106-111).[16] Since Herakleion-Thōnis does not appear as a point of origin in the papyri, we do not know its status regarding trade, and due to its proximity to Alexandria we can imagine that as a trading port it was eclipsed by the capital. Even before the reign of Ptolemy Soter, Kleomenēs of Naukratis supposedly transferred the *emporia* of Herakleion-Thōnis to Alexandria (Pseudo-Aristotle, *Oikonomika* 2.33e). The prevalence of colossal statues of the royal family at Herakleion-Thōnis (Albersmeier 2010, 191-198), however, demonstrates its continued importance during the Ptolemaic period. We can attribute the decline of the city in the Roman period to natural disasters and the loss of its importance for the royal cult, rather than as a result of trade competition alone (Goddio 2011, 129). Naukratis also appears to have declined as a centre of trade (Fraser 1972/1, 173; Rowlandson 2003, 254), and is not accorded the same status as Alexandria and Pelusion in *P. Rev*. Rowlandson (2003, 251) notes that Naukratis is very rarely referred to in extant papyri, and so lack of evidence prevents us from saying more.

We must ask whether the customs duties attested in the Zēnōn papyri and the restrictions on importation referred to in *P. Rev.* formed part of the same policy or whether instead the state had regulations on vegetable oil that differed from those relating to the goods imported in *PCZ* I 59012. Fraser (1972/1, 150) notes that the importation of olive oil suggests that this type of oil was exempt from the regulations in *P. Rev.* This would be strange due to the severity in enforcing the *telōnai*'s monopoly on vegetable oil, and because fats other than oil produced from seeds were considered unwanted competition (*P. Rev*., col. 50). It is possible, as Préaux (1936a 1984-5) states, that a dualistic policy existed in relation to these oils, or, as Rostovtzeff (1941, 356) assumes, that regulations on olive oil not contained in *P. Rev.* existed elsewhere. We have already seen that the

[16] Shipwrecks XI, XIV and XV.

system of contracting for industrial production appeared to vary depending on the kind of production taxed. *P. Rev*. offers another possibility. Col. 52 records that, though importation into Egypt of foreign oil for sale was prohibited, it could be brought into the country for personal use. This required the party conveying the oil to pay a duty on it of 12 drachmas per *metrētēs* of oil. Since the oil of the monopoly was sold at the price of 48 drachmas per *metrētēs* (*P. Rev.*, col. 40), this equates to a duty of 25% *ad valorem*. As we saw, 25% was one of the standard rates at which duties on certain goods were set according to *PCZ* I 59012. We can therefore see this allowance given in *P. Rev.* aligning with the general tariff policy as far as we know it. Even though in *PCZ* I 59012 oil carried with it a tariff of 50%, we need not class it as the same commodity as the vegetable oils produced under the supervision of the *telōnai*.

PCZ I 59015-R provides important evidence on importation for sale. This document records the conveyance of a large shipment of olive oil (1000 *metrētai*), possibly by Apollōnios (Edgar 1925/1, 30), the payment of duties (50% *ad valorem*), and its sale to the state. Préaux (1936a, 184) notes that the importation of such a large quantity of oil contradicts the policy of prohibition outlined in *P. Rev.* Rostovtzeff (1941, 1389, n 106) and Fraser (1972/2 262, n 148), however, both point out that *P. Rev.* does not mention olive oil, and we should not assume it was subject to any of the regulations described in that document. Although Rostovtzeff (1941, 356) argued that this lack of reference to olive oil in an extensive document on the regulations of the vegetable oil industry cannot be attributed to a paucity of olive cultivation in Egypt, Strabo (17.1.35) portrays Egyptian olive oil production in his time as poor, after three centuries of Greek rule in the country. It seems possible, therefore, that the importation of olive oil as recorded in *PCZ* I 59015-R was necessary due to the poor quality of the product in Egypt, assuming that Strabo presents this accurately. For further discussion concerning self-sufficiency and foreign trade, see CHAPTER 5.1.1.

This imported olive oil was sold to the state at a rate of 46 drachmas per *metrētēs* (*PCZ* I 59015-R, col. 7, 1-2), presumably in the same way that the *telōnai* of the vegetable oil monopoly sold the product of the workshops they supervised to the *oikonomoi* who conveyed the finished oil to retailers (*P. Rev.*, col. 55). We know of state depositories of oil at Alexandria from *P. Rev.*, cols. 54-55. That a large

shipment of goods was paid directly into these stores suggests a connection with the state in the organization of this shipping, as opposed to the state simply taking customs duties on any incoming merchant ships. We cannot expect that the state was obliged to buy from all merchants that came to Alexandria, and on the other hand, few ships would come at all if they had neither access to a market nor a guarantee that their goods would be sold. This suggests that the importers of *PCZ* I 59015-R had bought this right from the state. This possibility is supported further when we consider the organization of the Ptolemaic economy in general, which relied on the sale of tax-farming contracts for revenue. Such an arrangement had been proposed for the city-state of Teōs under Antigonos Monophthalmos, in which a certain party bought the right to be the sole importer of grain (*Syll.*[3] 344). Préaux (1954) saw this as anticipating or influencing Ptolemaic institutions of tax-farming.

One thing that might not fit with this scenario is the fact that the 50% customs duty was applied to at least a portion of this shipment (*PCZ* I 59015-R, 38), which we might expect to have been waived if the shipping had been contracted. This is the same rate for olive oil attested in *PCZ* I 59012. It is likely, however, that the customs duties were also subject to tax-farming and by rights belonged to the tax-farmer. This had been the arrangement of the *pentēkostē* customs duties at Athens and in other Greek cities (Möller 2007, 379; Migeotte 2009, 50-51), and the Ptolemies farmed these duties out in overseas subject cities (Bagnall 1976, 227). Customs duties on imports coming through the Red Sea ports were also farmed out in Roman Egypt (Pliny *NH*, 6.84; Wallace 1938, 257; Meredith 1953, 38-40; Sijpesteijn 1987, 5). We see indications of a state licensing of importation, and rather than being in conflict with *P. Rev.*, there appears to be some overlap. As noted, *P. Rev.*, cols. 52-53 distinguishes between general importation for sale, importation for personal use, and importation by merchants for sale. While the first was prohibited completely, the second was accompanied by high customs duties (as in *PCZ* I 59012), and the last was possibly contracted out to specially licensed merchants (as in *PCZ* I 59015-R). If we compare the shipments in *PCZ* I 59012 with that in *PCZ* I 59015-R, we see that the former was stored with various goods, mostly of relatively low quantities, while the latter was assessed for a single type of good at a much higher quantity; the former's value was around 3600

drachmas, and latter's supposedly 46,000 based on the sale of 1000 *metrētai* at 46 drachmas each (see Edgar 1925/1, 31, 34).

Also significant here is the possible origin of this shipment. Edgar (1925/1, 30) and Rostovtzeff (1932, 766) both assume, due to the listing of *hemikadia Milēsia* and *Samia,* that the olive oil, shipped in Milesian and Samian jars, came from Miletos and Samos. We must, however, make the distinction between the origin of the particular shipment referred to in this papyrus and the origin of the type of jar in which this olive oil was shipped. As Fraser (1972/2 286, n 284) notes, where a jar is referred to with an adjectival attribution such as the *Milēsia* and *Samia* we find in *PCZ* I 59015-R rather than a genitive form of a place-name as we find elsewhere, this term merely indicates the measurement implied by the form of the jar. Thus we cannot identify with any certainty the origin of this shipment.

As Rostovtzeff (1941, 384-385) notes, the evidence of how the state organized trade between Egypt and other Ptolemaic possessions is meagre. We know nothing of the possible provisioning by the state of staple goods and factors of production from these territories. The Kanopos Decree (17-18) records the state importation of grain into Egypt from other Ptolemaic possessions: Kypros, Kyrēnē, and Syria. This implies that such importation was not a usual occurrence, as the text relates to the importation in the context of famine. Since grain was a key product of Egypt, for export as well as for local consumption, this is unsurprising. It therefore tells us nothing about the usual practices concerning the state import of commodities that, unlike grain, were necessarily scarce in Egypt.

It is notable, however, that imported goods seem to have come largely from states or cities under Ptolemaic control or with whom the early Ptolemies had diplomatic ties. The various types of honey, for example, recorded in *PCZ* I 59012 all came from areas of Ptolemaic influence: Theangela, Rhodes, Lykia, and Athens. First mentioned is that from Theangela in Karia, where in the early reign of Ptolemy II a *stratēgos* and *oikonomos* are attested (Bagnall 1976, 101-102), and the taxes of which were farmed out in a similar manner to those in Egypt (*PCZ* I 59036; Bagnall and Derow 2004, 118). Rhodes in this period had very close economic and political ties with Alexandria, both importing grain and exporting amphorae (Fraser 1972/1, 162-9; Gabrielsen 2013, 66-81). Diodoros (20.81.4)

indeed notes the economic links backing up Rhodes' unofficial political support for Ptolemy in 312, since the city relied on Egypt for its food supply and Rhodian merchants did most of their trade there.[17] Lykia under Philadelphos was clearly under Ptolemaic control, with a garrison established there, shown by an inscription of 260/259 referring to a *phrouarkhos* (SEG 33 1183).[18]

Athens had close and friendly relations with the early Ptolemaic kings (Habicht 1992, 68-74). Ptolemy Soter had supported the city against Demētrios Poliorkētēs in both 295/4 (Plutarch *Dem.*, 33.4) and 287 (see the decree of Athens in honour of Kallias of Sphettos, Shear 1978), and Ptolemy Philadelphos induced the Athenians to join him in a league against Macedon in the so-called Khremonidean war in the 260s (*Syll.*^{3} 434/5; see Walbank 1984, 237; Marquaille 2008, 47; O'Neil 2008, 87). Thus, in relation to the kinds of honey imported, we can count two examples from what we can consider subject states or regions (Theangela and Lykia), and two from friendly or allied states (Rhodes and Athens). We see also goods from other Ptolemaic subjects in Asia Minor: Samos and Khios (see Bagnall 1976, 80-89 and 168). Indeed, the only commodity of which the origin was outside known Ptolemaic allied or subject states is the Pontic nuts (*PCZ* I 59012, 48).

This suggestion that goods were mainly imported from territories within the Ptolemaic sphere of influence is perhaps supported by the amphorae handles found in Alexandria. We find that out of the foreign handles of the Ptolemaic era, fully one-third were stamped Rhodian, with Koan and Knidian handles each representing one-fifth of the evidence (Cankardeş-Şenol and Şenol, 2013). This represents the vast majority of the handles, with the next most represented coming from Kypros (5% of the data), Kos (3%) and Thasos (3%).[19] The Greek states listed here can all be counted as within the Ptolemaic sphere of influence at one time or another. From the known restrictions on trade as part

[17] Fraser (1972/1, 165) notes that Diodoros probably relied on a contemporary source, Hieronymos of Kardia, in making this statement.

[18] Bagnall (1976, 108) links the inscription with the existence of a garrison.

[19] This is quite similar to the evidence given earlier by Fraser (1972/1, 165), who lists the foreign handles found at Alexandria as 80,000 Rhodian, 6860 Knidian, 1480 Koan, 650 Pamphylian, 190 Thasian, 160 Khian, and 980 marked in Latin. The only marked difference is the predominance of Rhodian handles in Fraser's data.

of Ptolemaic policy, it seems possible that this prevalence of goods from these areas demonstrates a policy of special privileges or trading rights given to these states with political or diplomatic associations. Based on this, it seems likely that the traders who bought contracts with the state for the importation of goods, as mentioned in *PCZ* I 59015-R, were to procure their commodities from these allied or subject states. Ptolemaic control over the importation of grain in subject states is implied in an inscription from Samothrace honouring Hippomedōn (Fraser 1959, 39-40). This demonstrates that control of trade in these subject territories was of concern to the state. I expand on this idea of Ptolemaic trade policy as based on special privileges, as well as its possible origins, in CHAPTER 5.1.2. Foreign merchants seem to have been able to procure goods directly from the *chōra* and not just from Alexandria: *PCZ* I 59021, col. 1, 23-25 records a complaint that money-changing regulations were inadvertently preventing some merchants from doing so.

To conclude on trade policy, it seems to have been organized on similar lines to other parts of the economy, with high tariffs imposed on the importation, and possibly contracts for the importation of goods for sale to the state. This is a modification of previous views, which placed emphasis only on the customs duties attested in *PCZ* I 59012. Alexandria and Pelusion emerged as the two points referred to in the evidence into which goods could be brought, although Fraser (1972/1, 149) suggests Syēnē and the Red Sea harbours as other possible points of importation. I undertake discussion of the implications of this trade policy in CHAPTER 4.1 and CHAPTER 5.1.

3.1.7 STATE CONTROL OVER INTERNAL TRADE

As Fraser (1972/1, 149) notes, at the time that he was writing detailed information on Ptolemaic policy concerning trade within Egypt, even on the level of that relating to foreign trade, was lacking. We know of the existence of dues on internal shipping, for example in the reference to a toll-station at Memphis at which a friend of Apollōnios had his iron confiscated (*PCZ* I 59031; for further discussion of this station see Hauben 1985, 183-187 and Thompson 1988, 59-65). Toll-stations in the plural are also mentioned in *PCZ* I 59289, line 10. *P. Hib.* I 110, dating to the mid-3rd century, attests

to the existence of several toll-stations between the Fayum and Alexandria. *P. Petr.* III 107 of 226 deals with the charges paid for passage on canals, demonstrating that these dues not only applied to Nile transport. For the 2nd century, Agatharkhidēs (22) records a toll-station at the frontier between Upper and Lower Egypt, which also existed in the Roman period (Sijpesteijn 1987, 22-23). We have little indication of the rates charged at these stations. *P. Hib.* I 80, however, does mention a 1/24th duty on wine in the Herakleopolite nome. Obviously if several of these dues had to be paid in a single journey, the costs could be considerable as noted by Fraser (1972/1, 149); however, lack of evidence of general rates means we cannot calculate its costs (Thompson 1988, 65).

We need not assume that the internal movement of goods carried multiple charges, since a receipt system might have been used as existed for conveying foreign oil brought into Egypt at Pelusion onwards to Alexandria, in which the duty did not have to be paid again on reaching the final destination (*P. Rev.*, col. 52). In the Roman period, however, we do see the application of various internal dues at different points in the country, for various purposes (Wallace 1938, 258-273; Sijpesteijn 1987, 16-26; Cottier 2010, 144-147). The consistency in the evidence concerning the few details on internal dues that we have for both Ptolemaic and Roman policy suggests that the latter was based on the former (Wallace 1938, 275; Cottier 2010, 148). This would imply that internal dues on shipping imposed substantial costs on the movement of goods within Egypt.

As in external trade, prohibitions existed on the movement of certain goods within Egypt. The oil contracted out to *telōnai*, for example, could not be imported from one nome to another (*P. Rev.*, col. 54). Prohibitions are also implied by the existence of exemptions on river traffic (*P. Hib.* II 198, 141-148; Bagnall 1969, 96-98) in a similar from to the exemptions for merchants' movement of foreign oil (*P. Rev*., col. 52). In the category of control and taxation of internal traffic we can include the state contracts for shipping. *Nauklēroi* bought the right to ship on the Nile, in conjunction with a *kybernētēs* (captain) and *kyrios* (owner) of a boat, though it was possible for him to perform all these roles (Hauben 1971, 259; Thompson 1983, 66). By this means, a further cost was imposed on the movement of goods along the Nile, and more revenue was collected by the state. The connection between shipping on the Nile and the state was indeed a close one for the entire Ptolemaic period: the

vast majority of evidence of *nauklēroi* shows them as shippers of state goods (Hauben 1971, 267), predominantly for the transport of grain (Hauben 1971, 273). We see, therefore, that internal shipping, just as external trade, came under the system of contracts applied across the economy. I note the effects of these charges and controls on shipping in CHAPTER 4.1.

3.1.8 STATE CONTROL OVER COINAGE

As noted in CHAPTER 2.2.4, the establishment of a Graeco-Macedonian elite in Egypt carried with it the spread of coinage as money. Coinage had been used in Egypt to a limited extent before this period, mostly in the form of foreign imports and imitations struck in Egypt (Muhs 2005, 4-5). The first Ptolemaic mint appears to have been established in Memphis in 326/325 (von Reden 2007, 33), with a mint operating at Alexandria by 315 (Manning 2010, 132). Coins with the portrait of Ptolemy I, however, did not appear until after his proclamation as a king in 306. By this time coins were already minted in gold, silver, and bronze. It was not until the reign of Ptolemy II, however, that bronze coinage came to be mass produced and thereafter became the main denomination in use (von Reden 2007, 58). We can understand this first as a result of the paucity of silver within the Ptolemaic realm, in contrast to the copper that was available in Kypros and Syria (Rostovtzeff 1941, 297). In addition to this, we must remember that in Egypt the copper *deben* had been the established unit against which other goods were valued (von Reden 2007, 49; Manning 2010, 134). It is likely its customary use also played a part in this.

The central aspect of this policy relating to coinage was the closed currency system, which had been established by 305, as shown by hoard evidence (Mørkholm 1982, 298; Christensen 2004, 41; von Reden 2007, 44); this policy prohibited the importation and use of foreign coinage within the Ptolemaic realm. That such a system was in effect by 300 is the general view in scholarship (Préaux 1939, 267-280; Rostovtzeff 1941, 401-402; Jenkins 1967, 53-74; Bagnall 1976, 176; Davies 1984, 279; Roger 2003, 347; Manning 2010, 33). *PCZ* I 59021, dating from 259/258 mentions a decree of Ptolemy II to the effect that foreign coins had to be exchanged for Ptolemaic coins, which can be

taken as a means of the state to limit the circulation of foreign coins (Bagnall 1976, 176 n2; Christensen 2004, 41). Von Reden (2007, 48) discounts this as evidence of a closed currency policy as it must refer to a decree significantly later than the observed disappearance of foreign coinage in hoards, and seems to only apply to gold coins. We should nevertheless take it as supporting the idea of a closed currency system as a state policy supported by the numismatic evidence. Although the decree referred more to the replacement of the older gold coins with a new issue by Philadelphos in the late 270s (von Reden 2007, 47), we can still see in this a continuity in policy and a need to ensure that these changes conformed to the overall policy of a closed currency system. I expand much more on the closed currency policy as well as a possible policy of monetization in CHAPTER 4.4 and CHAPTER 5.2.

3.2 *P. REV.* AND THE OPERATION OF THE ADMINISTRATION

Before analyzing the economic effects of policy in CHAPTER 4, I must assess the operation and effectiveness of the administration. Towards this, I focus closely here on *P. Rev.*, in particular those contracts concerning the collection of the *apomoira*, and the monopoly over the production of oil (see CHAPTER 1.2 for an outline of *P. Rev.*). This document provides us with a general picture of the incentives of officials, resulting from the structure of the administration. These incentives have been considered before (see Grenfell and Mahaffy 1896, 105-106; Harper, 1934a; 1934b; Préaux 1939, 450-459; Rostovtzeff 1941, 328-330; Bingen 1978a; Samuel 1993, 171; Manning 2010, 152-157), and my goal here is to cover this topic comprehensively, providing additional observations and considering its relationship to the state's economic power. It has been noted that an unusual feature of the Ptolemaic administration was that tax-farmers did not collect taxes as they had in Greece, removing one of their central functions (Préaux 1939, 450; Rostovtzeff 1941, 328; Bingen 1978a; Manning 2010, 155). I have already noted some of the other benefits provided by this system in the section on the *ōnai* above (CHAPTER 3.1.5), and I expand on that here by demonstrating how the state integrated *telōnai* with the regular administration, making each more effective.

As Bingen (1978a, 158-188) has shown, *P. Rev.* is made up of several documents and revisions, updated *ad hoc* in response to challenges that arose. Samuel (1993, 175) sees this as characteristic of the administration. It nevertheless allows us to view the operation of the administration in relation to this industry and the principles upon which the administration was organized in general. Although corruption certainly took place within the administration, and there was the possibility for officials to abuse their power (Préaux 1939, 515-522; Crawford 1978, 199; Bingen 1984, 199; Manning 2010, 153),[20] we see in *P. Rev.* a system of incentives that likely allowed for its reduction (Manning 2010, 155), explained in depth below.

This does not mean that the interplay between these regulations was pre-planned: even if it was irrational and *ad hoc* as emphasized by Samuel (1993, 175), the administration nevertheless showed the capacity to adapt to the circumstances in order to better enforce its regulations. This is borne out by the incentive structure itself. As Manning (2010, 157) notes, we lack the evidence from the texts to assess the performance of the tax-farming system, and the administration overall. Below I discuss the incentive structure of the tax-farming arrangements in *P. Rev.* to at least come to an understanding of the efficacy of these operations. Since these tax-farming contracts applied broadly across the economy, we can understand the regulations in *P. Rev.*as indicative of their administration generally, even if there would have been slightly different regulations for each industry.

One difficulty in assessing the administration's effectiveness is in knowing how real the fines and other punishments for failure, mentioned in *P. Rev.* actually were. Bagnall (1984, 19 n 30) argues that the continued threats made in *P. Tebt.* I 27 against a lax official, instead of actual punishment, indicate that such threats were not very likely to translate into consequences. We do not know the ultimate fate of the official in that document, however: whether he carried out his task, was punished by the state, or was left in his negligent position. The incentives for reporting and enforcement attested in *P.*

[20] On the bad behaviour and punishment of officials from the Menkhēs archive, see in particular *P. Tebt.* I 24, discussed by Verhoogt (1998, 149-166).

Rev. demonstrate that there were strong reasons why interested parties would seek actual consequences for officials' negligence. I discuss these below.

Taxation through these contracts was undertaken primarily under the direction of two kinds of agents: the *oikonomos* and the tax-farmer (*telōnēs*). As I noted in CHAPTER 2.1.2-2.1.4, the first can be seen as an overseer of state finances in the nome, and kept the accounts of what was owed by the *telōnēs* on assessed agricultural production, acting as an agent between the *telōnēs*, and the higher state officials such as the *dioikētēs*, the treasurer based in Alexandria. The *telōnēs* was an agent who purchased the right of taxation through state auction. As mentioned above (CHAPTER 3.1.5), we see that the first role of the tax farmer was in giving the state a sure estimation of revenue. The *telōnēs* also stood to gain from this arrangement, since any surplus over the amount owed to the state fell to him, perhaps up to 125% of the amount paid to the state (von Reden 2007, 95). The calculation of the amount owed to the state versus the surplus going to the tax farmer was a task of the *oikonomos*. Although the *telōnēs* clearly had an incentive to ensure that taxes were paid to them, they could be fined for failure in their duties, demonstrated throughout *P. Rev.* and discussed below, and even imprisoned (*P. Tebt.* III.I 772).

The office of the *oikonomos* acted as intermediary between the tax-farmers and tax-collectors, receiving the funds from the latter and crediting them to the former as required. This decoupling of the roles of tax-farming and tax-collecting ensured that the final recipient of the tax had no means of personally exacting this tax from tax-payers. At the same time it meant that the tax-farmer had an incentive to ensure the assessed amount was collected in full, which could not exist in the same way for salaried officials who did not directly gain from tax-collection. This acted as a check on the corruption of officials.

A basic consideration in developing the regulations seems to have been the placing of responsibility for each state action on more than one party. Thus, for example, the tax-collectors could only receive the tax in the presence of the *antigrapheus* (*P. Rev.*, cols. 10-11), the balancing of accounts could only occur in the presence of each of the *oikonomos*, *antigrapheus*, and *telōnēs* (*P. Rev.*, cols. 16, 34); see

TABLE 3. Most of the other regulations include the *telōnēs* as a mechanism of enforcement, based on his self-interest (see TABLE 4 below).

TABLE 3. Incentives for reporting infringements carried out by more than one party. For those relating to tax-farmers see TABLE 4 below.

A: Infringement	B: Parties Involved	Parties interested in enforcing regulations, incentivized to report A
Excessive collection of tax (*P. Rev.*, cols. 10-11)	Cultivator *Logeutēs* *Antigrapheus*	Cultivator (as tax-payer)
Fraudulent balancing of accounts (*P. Rev.*, cols. 18-21, 34)	*Oikonomos* *Antigrapheus* *Telōnēs*	*Oikonomos* (checked monthly by *dioikētēs* and fined for failure)

The checks set in place meant that any illegal action would incriminate each of the parties. Since the honest party would inform on the guilty party to avoid hefty (undeserved) punishment, corruption would require collusion between each of these parties. But the possibilities for collusion would have been compromised by the presence of an interested party, damaged by the offence, who would have reported it. This would have put the colluding parties into a Prisoner's Dilemma situation, in which the best option for each corrupt party would have been to defect and incriminate the other. Even if interested parties had a degree of difficulty in carrying out suits against corrupt officials, we can at least imagine that these incentives reduced corruption compared to a situation in which officials could act alone. The *telōnēs*, having an interest in the collection of the tax, acted as a check on the collusion of tax-payer and tax-collector. Therefore, the *logeutai* and *antigrapheus*, responsible for collection, could not be bribed by the taxpayer to reduce the amount collected.

The cultivator was protected from over-taxation, as both the cultivator and tax-farmer needed to make an agreement on the amount taxed (*P. Rev.*, col. 27). These agreements were sealed and passed on to

the *oikonomos*. In the event that the cultivator and tax-farmer failed to agree on the amount taxed, the *telōnēs* lost his right to receive the tax, and the *oikonomos*, having made an agreement with the cultivator, took the full amount for the state (*P. Rev.*, col 28). This made it impossible for the cultivator to bribe the *telōnēs* to reduce the produce assessed and the final tax owed. For ease in understanding, we can consider this in relation to the 10% rate on kleruchic and temple land. Under this 10% tax, any bribe to reduce the total amount tax, combined with this tax, would have to exceed 10% of the actual quantity of production to make it worthwhile for the *telōnēs*. But this would cost more to the cultivator than if he simply paid the tax. This is illustrated in TABLE 5. Any deviations from the regulations through bribery would result in a zero-sum gain and loss to each party respectively, preventing them from coming to such an agreement. This would have been entirely different if the assessment was made by a salaried official, such as the *oikonomos*, who did not stand to gain directly from the tax. This is illustrated in TABLE 6.

TABLE 4. Incentives for parties involved with the collection of the *apomoira* and the vegetable oil industry, as contained in *P. Rev.*

A: Action	B: Parties responsible	C: Gain/loss to B if failure in A (non-tax-farmers)	D: Gain/loss to tax-farmer if failure in A	E: Incentive 1	F: Incentive 2, following from E	G: Gain to State
1. Measuring and sealing produce of vineyards, paying the *apomoira* on it (col. 25)	Cultivator	Pay twice the *apomoira*	Gain twice the *apomoira*	Tax-farmers keen to report failure in A to gain D	B to avoid C by undertaking A	Ensures collection of *apomoira* and viability of tax-farming contracts
2. Registering capital goods for wine production (col. 26)	Cultivator	Pay compensation to tax-farmers	Gain compensation, based on own assessment	Tax-farmers keen to report failure in A to gain D	B to avoid C by undertaking A	Ensures all production is assessed, within monopoly
3. Agreement on assessed wine production (cols. 27-28)	Cultivator Tax-farmers	Must still pay tax based on *oikonomos'* assessment	Forfeits rights to tax on that production	No incentive for tax-farmers to assess production too high in order gain extra tax	-	Collects tax, checks rapacity of tax-farmers, protecting future production
4. Registration of orchards; agreement on assessment and taxation of production (col. 29)	Cultivator Tax-farmers	Produce granted to tax-farmers; if B's assessment too low, tax-farmers keep surplus, if too high, pay extra tax	Guaranteed tax by receiving produce up-front; if assessment too high, must return deficit	B to agree on accurate assessment	-	Accurate assessment of production; resolution of disputes between B
5. Notifying tax-farmers of the assessed vineyards and orchards, within ten days of tax auction (col. 33)	*Basilikos grammateus*	For failure or incorrect information, fine of 600 drachmas and double the loss incurred for each error	Gain 600 drachmas and double the loss incurred for each error	Scrutiny of report made by B, in order to gain D	Timely and accurate reporting of information to tax-farmers, in order to avoid C	Protects viability of tax-farming contracts

A: Action	**B: Parties responsible**	**C: Gain/loss to B if failure in A (non-tax-farmers)**	**D: Gain/loss to tax-farmer if failure in A**	**E: Incentive 1**	**F: Incentive 2, following from E**	**G: Gain to State**
6. Release of produce from stores only on having received a sealed receipt (col. 40)	Komarch	1,000 drachmas to the Crown and five times the loss incurred by the tax-farmer	Five-times the loss	Tax-farmers prosecute B to gain D if assessed quantity of produce not received	B scrutinizes release of produce	Keeps capital goods under state control; protects tax-contracts
7. Demonstration to tax-farmers of land sown as agreed (col. 41)	*Oikonomos* *Antigrapheus* Nomarch Toparch	Two talents to the Crown, compensation to the tax-farmers	Compensation in proportion to the lack of sowing, plus profit	Tax-farmers to scrutinize sowing in order to gain D	B ensuring cultivators sow seeds as required	Ensures production; protects tax-contracts
8. Agreement on assessed production of seeds (col. 42)	Cultivator Tax-farmers	Text breaks off, probably the same as regulations for cols. 27-28	-	-	-	-
9. Demonstration to tax-farmers of land sown as agreed, sixty days before harvest (col. 43)	Nomarch Cultivator	*Nomarch* pays compensation to tax-farmers, cultivators pay fine to *Nomarch*	Compensation	Tax-farmers to scrutinize sowing in order to gain D	Nomarch ensures cultivators sow seeds as required	Ensures production; protects tax-contracts
10. Paying wages to oil-workers, supplying seeds to factories (col. 45)	*Oikonomos*	Fined 3000 drachmas, compensates oil-workers, pays twice the amount of loss to tax-farmers	Twice the amount of loss	Tax-farmers keen to report failure in A to gain D; oil-makers report failure in A to gain their wages	B to avoid C by undertaking A	Ensures production; protects tax-contracts

A: Action	B: Parties responsible	C: Gain/loss to B if failure in A (non-tax-farmers)	D: Gain/loss to tax-farmer if failure in A	E: Incentive 1	F: Incentive 2, following from E	G: Gain to State
11. Sealing implements (col. 47)	*Oikonomos* Tax-farmers Oil-workers	Fined 1 talent of silver to the Crown, compensation to tax-farmers	Compensation	Tax-farmers keen to report failure in A to gain D	B to avoid C by undertaking A	Keeps presses under state and tax-farmer control.
12. Manufacturing oil outside of state workshops (col. 49)	Any	Judgement by the state, 3,000 drachmas to the tax-farmers, loss of oil and produce	Gains 3,000 drachmas	Tax-farmers keen to report engagement in A to prevent competition and gain D	High risk in illegal manufacture of oil; B to avoid C by refraining from A	Keeps production under state control; protects viability of tax-contracts.
13. Selling and buying excess lard (col. 50)	Butchers Buyers of lard	50 drachmas compensation to the tax-farmers for every piece sold	Gains 50 drachmas compensation for each piece sold	Tax-farmers scrutinize butchers' use of lard (they are explicitly granted this right)	B to avoid C by refraining from A	Lessens competition; protects viability of tax-contracts.
14. Temple registration of implements; production for household consumption only (col. 51)	Temples	Fined three talents to the Crown, must pay five times the loss to tax-farmers	Gains five-times the amount of loss	Tax-farmers scrutinize temple production in order to gain D (they are explicitly granted this right)	B to avoid C by undertaking A	Lessens competition; protects viability of tax-contracts; brings oil production under state rather than temple control.
15. Conducting inspections (col. 55)	Agent of the *oikonomos* Agent of the *antigrapheus*	Twice the amount of the tax-farmer's valuation of contraband	Gains twice the amount of the own valuation of contraband	B to avoid C by undertaking A	-	Allowing tax-farmers to inspect for infractions to regulations; protects viability of tax-contracts

TABLE 5. Hypothetical scenarios of cultivators bribing tax-farmers to lower assessment on production (tax rate is 10%). These illustrate that no mutually beneficial deviation from the regulations could be reached. Adjusting the bribe higher results in a loss to the cultivator; adjusting the assessed production lower results in a loss to the tax-farmer.

Value of actual production	Value of tax on actual Production	Value of bribe paid by cultivator to tax-farmer	Value of Assessed Production	Value of tax on assessed production	Combined cost of tax and bribe	Cultivators' gain/loss due to bribe	Tax-farmer's gain/loss due to bribe
1000	100	90	100	10	100	0	0
1000	100	80	100	10	90	+10	-10
1000	100	90	200	20	110	-10	+10
1000	100	20	800	80	100	0	0
1000	100	20	700	70	90	+10	-10
1000	100	20	900	90	110	-10	+10

TABLE 6. Hypothetical scenarios of cultivators bribing officials to lower assessment on production (tax rate is 10%). These illustrate that, taking these scenarios alone, a mutually beneficial result could be achieved as long as the bribe was no higher than the tax on actual production. The state pays for this in revenue foregone.

Value of actual production	Value of tax on actual Production	Value of bribe paid by cultivator to official	Value of Assessed Production	Value of tax on assessed production	Combined cost of tax and bribe	Cultivator's gain from bribe	Official's gain from bribe	State Revenue Lost
1000	100	90	100	10	100	0	90	90
1000	100	80	100	10	90	10	80	90
1000	100	20	800	80	100	0	20	20
1000	100	20	700	70	90	10	20	30

The incentives inherent in the regulations relating to assessment were similar to those relating to collection: in both cases all parties who could gain from fraud were removed. In this, however, there was even less of a need of a third-party to enforce the regulations, since if the agreement failed, the *telōnēs* lost his taxation rights, which obviously meant he received an amount of tax lower than any possible assessment (see row 3 in TABLE 4). Once again, any attempt to get around these regulations would require the *telōnēs* to perjure himself and collude with both the *oikonomos* and the *antigrapheus*, since they made the assessment in the case of a dispute (*P. Rev.*, col. 28). For reasons stated above, this was a risky venture. Rostovtzeff's (1941, 329) claim, therefore, that tax-payers were necessarily despoiled by the combination of officials and tax-farmers is an exaggeration. He asserts that the interest of the officials and the tax-farmer were identical, when this is plainly untrue: the officials had no need to collude with the tax-farmer to extort the tax-payer, since in this instance they gained the right of assessment as well as overseeing collection in the event that the tax-payer refused to make an agreement with the tax-farmer. This would allow the officials to despoil the tax-payer directly, if they so wished. The tax-farmer, therefore, could not entice the *oikonomos* and *antigrapheus* to approve an incorrect assessment. As Harper (1934a, 64) notes, the sealed agreement between the *telōnēs* and the cultivator meant that the latter knew exactly how much was owed, and could use it as evidence of extortion.

In relation to the assessment of orchards, the *telōnēs* was in the position to seize the produce in the event that an agreement could be reached between him and the cultivator (*P. Rev.*, col. 29). He was then to repay the cultivator to the amount according to the cultivator's assessment and keep the remainder. In this way, the final amount exacted from the cultivator would be the same as if it were a tax taken on an accurate assessment (see the fourth row of TABLE 4). The methods of taxation presented in *P. Rev.* demonstrate that the state was aware of incentive problems and of corruption in taxation, and sought to create a system that would guard against these obstacles. Through this incentive structure, the officials, cultivators and *telōnai* acted to the benefit of state revenue rather than in collusion with each other, against the interests of the state. The observations made by Bingen (1978a, 158-188) on the *ad hoc* nature of *P. Rev.* do not refute this idea, but even strengthen it, since it

demonstrates that the authors of these regulations wished to optimize them based on a process of trial and error.

The oil produced by these factories was sold at a fixed price of 48 drachmas per *metrētēs* (*P. Rev*., col. 40). It is notable that the different prices presented here do not correspond to the different qualities or grades of oil (Bingen 1978a, 180). The *oikonomos* was responsible for ensuring that retailers did not deviate from state fixed prices (*P. Tebt.* III.I 703, 174-182), and official concern for high excessive prices is attested in *W. Chr.* 300. We can imagine that consumers would have been keen to report high sale prices to officials. In the operation of the oil monopoly we see the same method of splitting the tasks of administration between the *oikonomos* and the *antigrapheus,* and the tax-farmer. This is apparent at several stages of production. The *oikonomos,* along with the *antigrapheus,* the nomarch and the toparch, were responsible for ensuring that the correct amount of seed had been sown. The fine for failing to do so was two talents to the treasury and compensation to the tax-farmer (*P. Rev.*, col. 41). Since only the factories under the control of the appointed tax-farmers were permitted by the state to manufacture oil, cultivators of seeds were not permitted to sell their seeds to anyone except the appropriate tax-farmers. Here we see the first example of state control of capital goods in relation to oil production. The komarch was given the task of preventing unauthorized sale of seed and had the power to prevent produce from leaving a village.

The seeds required for production could only be released from the village through the presentation of a sealed receipt to the komarch (*P. Rev.*, cols. 39-40). Since the fines for failure in this regulation fell upon the komarch (1000 drachmas to the treasury), and compensation fell to the tax-farmer should the komarch be lacking in his duties (five times the amount of the tax-farmers loss), it was in the interest of the komarch to scrutinize and keep a record of both the movement of seeds out of the village and the receipts presented to him by the tax-farmers. The tax-farmers themselves had an incentive to keep close watch on the actions of the komarch. Even though a fine for the failure of the *oikonomos* to deposit the required amount of seeds in the workshops is not specified, there was an incentive for the *oikonomos* to keep track of the stock of seeds, since he could be held responsible and heavily fined for insufficient sowing.

The flow of wages from the *oikonomos* to the workmen appears to have been kept very tightly in check due to the fines and compensation associated with the failure of their provision (*P. Rev.*, col. 45). The contractors, therefore, prevented the *oikonomos* from embezzling the wages, and the workmen prevented collusion between the contractors and the *oikonomos*. The *oikonomos* and *antigrapheus* had control over the production goods that the tax-farmer required in order to carry out the manufacture of oil. They had to provide the tools for the factories and the wages of the workmen, with fines to the treasury and compensation to the tax-farmers for failure to do this, but they also had the role of sealing up the tools when production was not permitted to take place (*P. Rev.*, col. 45). The *oikonomos* had at all times an agent who supervised the factory alongside the tax-farmer (*P. Rev.* cols., 46-47), and both the tax-farmer and *oikonomos* had to ensure that a certain amount of oil production occurred daily. We again see here the control of capital goods by the state. Since the *oikonomos* was fined for many transgressions and was required to pay compensation to the *telōnai*, the state structured its regulations so that the *telōnai*, in addition to their role in providing certain revenue to the state in coin, served to enforce them. Because of this, even collusion between the *oikonomos* and the *telōnai* placed the *oikonomos* in a compromising position (see TABLE 4).

The dealers and retailers of oil in the cities had to be registered; this was undertaken by the clerk of the *oikonomos*. The transport of the oil to these dealers and retailers was a task of the *oikonomos* and *antigrapheus*, who were to measure it out to them every five days, and receive payment within the next five days (*P. Rev.*, col. 48). The cost of transport fell upon the tax-farmers. It is important that the interaction between the dealers of oil and the oil factory was undertaken by the *oikonomos*, *antigrapheus* and their agent rather than by the *telōnai*. These agents did not stand to gain in any change of price as the payment did not actually fall to them, and so, by the use of these middlemen between the *telōnai* and the dealers, the possibility of collusion between those two parties was minimized. At the same time, the tax-farmers were given the incentive to ensure that the *oikonomos* handed over the full payment to him, in accordance with the regulations.

P. Rev. (col. 55) also describes the procedure for inspections of factories should the tax-farmers believe that oil or presses had been concealed. These searches required the presence of the agent of

the *oikonomos* or *antigrapheus*, with fines for their non-attendance, providing incentives for timely inspections. One such inspection is attested in *P. Tebt.* I 39. In this document, the *telōnēs* Apollodōros writes to Menkhēs, the *kōmogrammateus* of Kerkeosiris, demanding that action be taken to grant him ten copper talents as compensation for the possession of contraband oil. This demonstrates that *telōnai* could be keen to ensure they gained the full benefit of their contracts, communicating with other officials as needed.

We see the extent of this monopoly in the fact that temple production was subject to its regulation (*P. Rev.*, cols. 50-52). The estates of the temples, however, were not completely prohibited from manufacturing oil. This is in line with a degree of economic privileges held by the temples in other respects, such as a reduction in the rate of the *apomoira* and the payment of a fixed land tax at a lower rate than the harvest tax, mentioned above (CHAPTER 3.1.3). The extent of their oil production capacity had to be declared to the tax farmers as well as to the *oikonomos*, and oil production itself could only take place in the presence of those agents. All manufacture of oil was confined to a two month period of supervision, during which the temples were permitted to produce the amount of oil which they declared as their yearly consumption. The temples were not allowed to produce *kiki* (castor) oil, however, and so had to buy it from the monopoly.

The production of oil in the temples was only granted for temple consumption, i.e. the temples were not allowed to sell any oil in competition with the tax-farmers of the oil monopoly (*P Rev*, col. 51). Since the *telōnai* stood to gain so greatly from the temples' refusal to cooperate with the regulations, it seems likely that they would have put a degree of energy into the surveillance of temple oil production, and therefore agents of the bureaucracy were less important in the enforcement of these regulations than they would have been if such an incentive was not built into them. Although the temples were given the privilege of the production of their own oil, they were by no means free from the influence of the oil monopoly. The *telōnai* who received the right to manage the monopoly were closely connected with the temple regulations; not only were the temples prevented from the production of all kinds of oil, but they were only allowed to produce even the permitted types within the designated period. Thus, even though oil production in the temples may appear at first glance to

be separated from that of the oil monopoly, this production was under the close guard of the monopoly agents, and there was every incentive for these agents, in particular the *telōnēs*, to keep a vigilant watch over them. The temples therefore gained the privilege of production, but by this ensured that their production would be scrutinized.

By enacting regulations specific to temple oil production, the state likely realized the relatively advantageous position temples had in accessing production goods for oil manufacture. Allowing them to produce some oil is perhaps an instance of the state creating a grant of what it cannot prevent, and, more importantly, as it was under the watch of both state officials and oil-monopoly competitors in the *telōnai*, it is probable that the oil monopolies suffered a smaller degree of competition from temples than if the state attempted to outlaw temple oil production completely. This is because the surveillance by the *telōnai* and the officials of temple oil production occurred as a privilege rather than an imposition. Permitting production for temple consumption also meant that temples were not forced to flout the regulations altogether in order to produce oil. From there, it might have been a small step to disregard other elements of the ordinances. There was, therefore, a requirement for the state to grant a privilege to the temples in order to facilitate their compliance.

It seems, then, that the state in its organization of the oil monopoly presented in the *P. Rev.* attempted to enforce its regulations through a system of incentives that would prevent its agents from shirking their responsibilities or colluding with each other against the wishes of the state. By taking the interests of those involved in the administration and management of the oil monopoly into account, the regulations appear to be structured so that those agents had an incentive to ensure that the other agents continued to work according to the rules, since it would have been to their own detriment, and not only to that of the state. These regulations, therefore, aimed to align the interests of the *oikonomos*, *telōnēs* etc. with the interest of the state and against the interests of each other so that these agents, while acting in accordance with the wishes of the state, were themselves the major means of enforcing the regulations. The existence of such a system of incentives also suggests that they were enforced to a greater degree than if these regulations contained penalties for the breaking of the rules, but without the self-enforcing mechanism of pitting the interests of the parties bound by

these regulations against those of each other and in communion with those of the state. We can perhaps expect then that these regulations were meaningful for oil production. This is not to discount any possibility of corruption on the part of those involved in the oil monopoly. It is only to say that the authors of the regulations appear to have been aware of problems of corruption and attempted to increase the risk of engaging in such activities accordingly.

That we see such an awareness of corruption and an effort to prevent such activities by directing agents' interests demonstrates that these were basic concerns of the Ptolemaic administration. We can, therefore, expect that such a structuring of incentives as appears in the *P. Rev.* was not limited to the areas contained within that document, but extended to the enforcement of other state policies about which we might have less detailed information. In connection with this, we can see under Philadelphos the existence of informers to the state (*mēnutai*) who were instrumental in such enforcement (Rostovtzeff 1941, 350). As Bauschatz (2007, 14) shows, the extent of police corruption as recorded the papyri is perhaps lower than expected, despite significant potential. This bolsters the idea that corruption within the administration, while apparent, could be dealt with and did not bring about its paralysis. It is possible that we simply lack the evidence necessary to give a full picture of administrative abuses. As Préaux (1939, 455) noted, the nature of the sources are such that we see the shortcomings of Ptolemaic policy more than its benefits.

Control of production, of course, meant the control of capital goods required for that production. This means that we must understand the controls on the manufacture of certain products within the system of industrial *ōnai* as extending beyond the production of consumption goods only. Not only did the state have to ensure the production of the necessary capital goods for the manufacture of the consumption goods which they hoped to bring about through the contracting of monopolies, but if the monopoly structure was to be effective, they also had to keep control on the production and ownership of those capital goods as part of their controls on the production of the relevant consumption goods. Hence we see the restrictions on the ownership of tools in the oil monopoly, and the task of the *oikonomos* to seal up the tools when they were not supposed to be used, in the contexts of both the oil monopoly and the linen industry (*P. Rev.*, col 51*; P. Tebt.* III.I 703, 135-164). It must be recognized,

therefore, that in Ptolemaic Egypt a monopoly in oil or beer implied a further monopoly in the higher order goods that were necessary for production in the *ōnai*, i.e., the industries contracted out to tax-farmers. This, of course, extended beyond a single order of production above that of the *ōnai*, i.e. the capital goods used directly in the monopolies in turn required further capital goods for their manufacture, which also had to come under state control. Although we do not see an official existence of monopolies for these higher order goods as *ōnai*, their production must have been contracted out in a similar manner to that of the monopolies, for example in the case of the cultivation of trees. This means that although the method of contracting out the management of production in these monopolies ensured that these industries did not fall under complete direction of the bureaucracy, there was a fundamental requirement of the state to have control of the capital goods in the most important industries.

3.3 CONCLUSIONS

In this chapter, I have provided an overview of the methods of state involvement in the economy of Ptolemaic Egypt, and the methods through which this involvement was able to take place. We see that the Ptolemies held considerable influence over the operation of the economy, both in terms of the direction of activity and in the capture of resources. I have argued that they were able to do this relying on a relatively effective administrative structure, which was based upon a set of incentives that tended to align the interests of the relevant agents alongside those of the king rather than with each other and to the detriment of the effective operation of his bureaucracy. This understanding of political involvement in the economy provides the basis of the analysis of its effects, contained in CHAPTER 4.

A substantial degree of state influence over the economy was noted, as has been long recognized (Tarn 1928, 255-257; Heichelheim 1970 [1938], 189; Préaux 1939, 569-570; Rostovtzeff 1941, 272). The introduction of *telōnai* also demonstrates a consistency in the organization of state programs, which can be understood as aimed at the increasing the effectiveness of the administration, as well as

allowing a greater collection of taxes in coin. Significant state direction was apparent in this, as I have demonstrated. It must be emphasized, however, that this economic planning was primarily concerned with control over the production of goods for which tax could be raised through the sale of contracts, rather than with the specific allocation of goods for their consumption, or with production divorced from taxation. There was obviously a connection between control over production and consumption, since certain parties who were afforded access to key factors of production by the state, as were the kleruchs for example, gained a greater degree of consumption. We do not, however, see a redistribution of resources divorced from engagement in production or service to the state.

Economic planning seems to have been a result of the control that the state had over factors of production, required for an effective means of drawing revenue from them. In the case of the vegetable oil monopoly, the state took control over the necessary capital goods, most importantly presses and seed, so that the contracts auctioned off for this production could effectively carry an exclusive privilege. From this point it is unsurprising that regulations were attached to this production, but the point to emphasize is that these regulations were secondary to the initial capture of this industry for revenue and internal control. In order to demonstrate that tax-farming contracts were profitable, the state had to ensure that it had sufficient control over the related industries.

This is not to say that we cannot note important examples of economic planning undertaken by the state, for example in the sowing schedule and the vegetable oil monopoly. It is, however, misleading to use a term that might imply that all areas of the economy were directed in this way, or that all aspects of state directed economic activities were planned in advance as parts of a single plan of the central state, with all the inputs and outputs calculated according to a predetermined design. As mentioned, we see important examples of local planning in the administration of the *diagraphē tou sporou*, and it is clear that both *P. Rev.* and *P. Tebt.* III.I 703, despite being sent out from the office of the *dioikētēs*, were focused on giving instructions to officials within the unit of the nome. These officials were given general instructions and held responsible for the organization of the nome economy, holding broad powers to do so. The incentive structures developed to create a self-enforcing system with the nome, without often requiring the direct intervention of the *dioikētēs*, also

testifies to this. We can say, therefore, that the control of resources was a policy of the central state, but their management was devolved to local parties, i.e. there was central control, but local planning. I expand on this in the CHAPTER 6 in light of the observations I make in CHAPTER 4 and CHAPTER 5.

CHAPTER 4: ECONOMIC EFFECTS OF POLICY

In this chapter, I analyze the economic effects of the policies described in CHAPTER 3, detailing the impact these had on both production and exchange. I consider effects of customs duties on importation, the effects of the state's control over factors of production and coinage, and its influence over retailing through the sale of monopoly licenses. Economic theory is referred to throughout in order to explain these effects more thoroughly. A degree of speculation based on these theoretical assumptions arises, and the conclusions that follow are presented accordingly: that these effects are likely considering the ancient evidence and the theoretical explanation, but nevertheless conjectural since the actual effects posited cannot be tracked. For the methodological considerations on which this is based, refer to CHAPTER 2.2.

4.1 THE EFFECTS OF CUSTOMS DUTIES

In relation to trade policy, I consider the effects of prohibitions and customs duties on importation and the revenues of the state. In addition to direct effects, I also explore indirect results of this policy, such as those on local production, and the use of goods as status items. In CHAPTER 3.1.6, I outlined the prohibitions and high customs duties that were applied on importation, and noted the connection between the state and the importation of goods, suggesting the possibility that contracts were sold for the shipping of goods. These customs duties have generally been viewed as impacting trade (Andréadès 1932, 19; Rostovtzeff 1941, 385; Préaux 1947, 58; 1954, 322; Fraser 1972/1, 150; Sijpesteijn 1987, 1), and here I explain their effects comprehensively.

The impact of these state actions on revenues and on the availability of foreign goods are intrinsically linked, and I discuss them here together. If we consider trade to have been conducted by merchants freely bringing their goods for sale, as the scholars mentioned above implied, the extent of both revenues and importation relied on the following factors: the total costs to the seller, the price of

goods determined by supply and demand, and the profit falling to the seller of the goods. If the sellers of goods judged the sale price as more than the total of costs plus adequate profit, then the situation allowed for a viable shipping of goods, and there was the possibility of importation. We should consider these duties as a cost of sale in the same way we consider buying and shipping the good as a cost. The seller had to consider this in calculating profit by subtracting the total costs from the final sale price. The effect on imposing this extra tariff cost on sellers would be an increase in this cost across the board and an increase in the price at which they would have to sell in order to make a profit. Where this made importation unprofitable, it reduced the quantity of goods imported and raised the domestic price of the good (Krugman 2009, 212-213; Mankiw 2012, 177-178).

The rates of the tariffs, as mentioned in CHAPTER 3.1.6, were set at various levels depending on the kind of good. These were set at 50%, 33.5%, 25% or 20% of the value of the good, depending on the particular product imported (*PCZ* I 59012). Most of the imported items attested are consumption goods, with the highest rates falling on wine and oil. Obviously the higher the rate of the tariff, the greater amount of revenue fell to the state, all other things being equal. Clearly, however, there is the likelihood that, where the existence of these extra costs eliminated the profitability of importation, high tariffs reduced the volume of goods imported. Their high rates seem likely to have reduced importation to the extent that revenue was also reduced, i.e. these duties were likely not optimal for revenue collection. We can understand this through comparing Ptolemaic customs duties with those of other pre-modern states, as presented in TABLE 7. Data on the customs duties of earlier states and of most states contemporary with the Ptolemies are unavailable.

TABLE 7. Comparison of customs duties rates of various pre-modern states.

Historical state and attested timeframe	Rates of customs duties *ad valorem*
Athens (c. 400)	2%, the so-called *pentēkostē* or 'one –fiftieth tax' (French 1990, 31; Möller 2007, 378-379).
Early Ptolemaic Egypt (3rd century)	20-50% (*PCZ* I 59012). See in particular Andréadès (1932, 10-18), Préaux (1939, 371-379) and Bresson (2012).
Seleukid Empire (3rd-2nd centuries)	2%, the so-called *pentēkostē* or 'one –fiftieth tax' (Aperghis 2004, 160).
Early Roman Empire (1st-2nd centuries CE)	2-5% (Duncan-Jones 1974, 2; Duncan-Jones 2006, 4); a difference of up to 2.5% between various provinces (Heichelheim 1970 [1938], 271). A 25% rate for importation into Alexandria is attested in a single 2nd-century papyrus, *P. Vindob.* G 40822 (published in Casson 1990). Sijpesteijn (1987, 5), Duncan-Jones (2006, 4) and Rathbone (2007, 716-717) accept this as the rate for goods entering Egypt. Strabo (17.1.3) notes the existence of both import and export duties at Alexandria, but does not mention rates. A 25% rate is mentioned in the *Periplus Maris Erythraei* (19) to have been levied on importation into Leukē Komē, perhaps under Roman control.[21]
Byzantine Empire (7th-12th centuries CE)	10% (Hendy 1985, 596; Oikonomides 1997, 230); reduced from 12.5% in the 7th century CE (Treadgold 1997, 409).

[21] As mentioned in CHAPTER 3.1.6, there are both problems with the *Periplus* overall and with this particular figure (Sidebotham 1986, 106-107). Both Sidebotham (1986, 107-108) and Young (1997, 266-268) see the prevention of evading other customs-posts as the purpose for this high rate.

Early Ottoman Empire (15th-17th centuries CE)	2-5% (Inalcik and Quatert 1994, 238; 258; 261; 303). Muslims and Ottoman subjects exempt from or paid reduced rates on certain duties (Inalcik and Quatert 1994, 251; 261); from 1521 CE this privilege ended for all Ottoman non-Muslims (Inalcik and Quatert 1994, 252). Rates of up to 7% on the importation of certain Western products into the port of Tripoli (Inalcik and Quatert 1994, 348).

From this we see that other historical tariff rates were significantly lower across the board than those imposed by the Ptolemaic state. As Préaux (1939, 375) notes, the customs duties rates that appear in *PCZ* I 59012 are the highest ones known for the ancient world, with the only comparable ones being those from Egypt or the Red Sea in the Roman period. If we assume that the customs duties of other states in TABLE 7 were intended to be optimal for revenue collection and that the profitability of goods was comparable in the Ptolemaic period, it would seem that Ptolemaic tariffs reduced importation and the quantity of revenue collected. This has been the basis of the idea that the Ptolemaic state imposed these tariffs to protect local production against foreign competition (Andréadès 1932, 19; Rostovtzeff 1941, 385; Préaux 1947, 58; 1954, 322; Fraser 1972/1, 150), considered in CHAPTER 5.1.1. We should realize, however, that these high customs duties did not necessarily prevent importation, as is borne out in *PCZ* I 59012-59015-R. These documents show that demand for these goods was high enough for importation to occur despite high customs duties. The effects of this trade policy, therefore, were not uniform and depended on particular supply and demand. In some cases, we can expect it to have prevented importation, and in others, such as those attested in the Zēnōn papyri, we can expect it to have worked to generate revenue. Based on the comparison with other historical rates, we might expect that the total revenue generated at these rates was lower. But this cannot be assumed either, and again depends on supply and demand.

It is possible that the administration could have known the effects of high tariffs on revenue collection. In Medieval Egypt, for example, it seems to have been obvious that a lower amount of revenue could be collected through a relatively higher rate of taxation, and a higher amount through a relatively lower rate, showing knowledge of an optimum rate (*Nahj al-Balaghah,* letter 53). As in the case of Ptolemaic Egypt, these observations were made in light of a very similar economic structure (that of Egypt), and without requiring a formal theory such as that of modern economics. In addition to this, Greek writers of the 4th century had already raised questions concerning the maximization of revenue. Xenophon's *Poroi* and pseudo-Aristotle's *Oikonomika* (2) both gave particular attention to the best means of revenue collection, and we can expect that the study of these matters in government departments extended well beyond that of these works circulating beyond them.

A tariff rate between 20% and 50% suggests that any goods imported must have been highly profitable before the duty was applied. The goods imported might have been a significant revenue source per item, with the state capturing this high profit. Since goods with a 50% customs duty were definitely imported (see CHAPTER 3.1.6), these likely represented a good return to the state. We can compare this again to the high customs duties imposed on importation into Egypt and Leukē Komē in the Roman period, in contrast to the low customs duties existing throughout the rest of the Roman Empire. This imposition of similarly high duties in the Roman Empire, where low rates seem to have been considered optimal, suggests that in Egypt and the Red Sea, these high rates might have been able to generate revenue (Wallace 1938, 257), though other reasons for such high rates have been suggested (on these points see TABLE 7 above). I suggested in CHAPTER 3.1.6 that because the monetary economy was organized with tax-farming contracts, and this was the standard method of collecting customs duties across the Greek world, it is likely Ptolemaic customs duties were also farmed out. If that was the case, these must have provided a return, and could not have simply prevented importation. I expand on this below.

Customs duties are a relatively low-cost means of revenue collection (Krugman 2009, 212). Instead of having to deploy officials to assess taxable goods, as in other forms of taxation in Ptolemaic Egypt, importers presented themselves for assessment. It was difficult for merchants to avoid channels

controlled by the state due to the geographical nature of Egypt: Diodoros (1.31.2) noted the lack of safe harbours between Paraitonion and Joppa, apart from Alexandria. At the same time, because of the high profitability required for importation, significant revenue per item imported must have been collected. Another factor in assessing the importance of these tariffs as a source of revenue is a consideration of the volume of goods imported, which cannot be quantified based on the lack of evidence. It is important, however, to note the low cost and high value of the collection of these tariffs. Since there is evidence of importation, the revenue generated might have been considerable. The effects of the toll-collectors along the Nile were likely similar to those of tariffs, but to a lesser degree due to the lower rates of the tolls. This would have reduced the flow of goods within Egypt, lessening the tendency towards the equalization of prices in the Egyptian market.

If importation was reduced by these duties, their supply in the market would have fallen, raising their price (Bresson 2012, 79). This heightened price might have created a market signal to those within Egypt to engage in further production of these goods no longer being imported (Krugman 2009, 212; Mankiw 2012, 177-178). The result would be a relative increase in the local production of types of goods that could otherwise have been imported. If that was the case, the extent of economic specialization of production within Egypt would have been reduced. Consequently, the economic gains coming from an even greater degree of production of goods in which Egypt held a comparative advantage would have been lessened. During the Hellenistic period, grain was the major export of Egypt (Rostovtzeff 1932, 761; 1941, 359, 381, 392; Casson 1954, 168; Fraser 1972/1, 165) and it must have been in great demand abroad. Because of this, at least some goods would have been more cheaply acquired by effectively trading grain for them, rather than producing them locally. If restrictions to importation resulted in the local production of goods that could have been imported, this shifted production away from grain cultivation. This reduction in specialization might have prevented even further gains from this export trade.

We can imagine, however, that this shift to local production could not have occurred for all products, since there might have been status items which could only be imported. Consumers likely saw at least some of these imported goods as greater quality items than some of the locally produced goods. The

ancients certainly distinguished between different qualities of wine (Boulay 2015, 273-282). In the 1st century CE, Pliny (*NH*, 14.9) states that the foreign (non-Italian) wines best-esteemed before his time were those of Thasos, Khios, and Lesbos, citing the 3rd century physician Erasistratos for the last (cf. Athēnaios 32F-33A). In this list of foreign wines, only one Egyptian variety is mentioned, derived from the Thasian grape. Kallimachos (Fr. 399) wrote of the shipping of Khian and Lesbian wine across the Aegean, indicating their reputation and their worth as a subject of poetry. We can expect that, apart from actual differences in quality, some of these foreign goods were seen as status symbols, as French champagne is today. Von Reden (2011, 428) notes that Egyptian wine was considered of inferior quality than these foreign varieties of wine. Local production, therefore, was not necessarily in competition with them, since from the perspective of the market, some of these local and foreign goods were actually of different classes; substitution of foreign goods with local ones was sometimes impossible. High customs duties, raising the price of these foreign goods, might have increased their perception as luxury or status items, available only to the elite class or those of means. In turn, this might have increased the demand for these goods from status-seekers. This likely helps to explain the continued importation of goods attested in the Zēnōn papyri, although we probably cannot consider all of these as luxuries. Fraser (1972/1, 160) noted that these represented the staple goods of Greek daily consumption.

Restricting imports and reducing specialization in this way would have meant that the market in local goods was less affected by economic conditions or political disturbances outside Egypt. This is connected with the aforementioned idea that high customs duties were intended to reduce foreign competition within Egypt, in favour of local production. The producers of goods such as wine and olive oil, which were more typical of Greek than of Egyptian consumption (van Minnen 2001, 1265-6; von Reden 2011, 433), likely had an initial advantage in the production of these goods because of local traditions of production and capital investments for their manufacture.[22] This might have

[22] Although wine was produced and consumed in Egypt long before the Ptolemaic period (Eyre 1994, 60; McGovern 1997, 72), beer had always been and was still the main drink and a major source of calories for the general population (Thompson 1999b, 133; van Minnen 2001, 1265; Clarysse and Thompson 2006/2, 198-199;

increased the reliance on imports from established regions of production. Although based on the evidence we cannot calculate the costs of Nile transport (Thompson 1983, 69), it is possible that they were less than those of transporting goods by sea between Egypt and the states of Greece and Asia Minor. If that was the case, local production of these goods would have had a natural market advantage over the importation of foreign items, apart from any state policy. Strabo (17.1.7) notes that more goods were moved through Alexandria's land-ward facing harbour on Lake Mareōtis than through its sea port, suggesting the city's greater dependence on Egyptian rather than Mediterranean trade, if the situation in Strabo's day reflected that under the early Ptolemies. Strabo (16.2.9; 17.1.35), however, suggests that Egypt was certainly not self-sufficient in typically Greek goods such as olive oil and wine, indicating poor production of the former and regular importation of the latter. On this see the discussion of self-sufficiency in CHAPTER 5.1.1.

The introduction of new species and breeds of livestock and plants from abroad, such as Milesian sheep (*PCZ* I 59195) and Sicilian pigs (*PCZ* I 59710), new kinds of wheat (Crawford 1979, 140-141; Thompson 1984, 368-369; 1999b, 128; von Reden 2011, 429-430), as well as the cultivation of olives and vines in the Fayum (Rostovtzeff 1941, 353-356; Thompson 1999b, 131-134) increased local production of substitute goods and subsequently reduced the need for importation. This may have been a response to high customs duties; however, immigrants, who had wealth and the desire for familiar products could have been the primary impetus for this (Thompson 1984, 367; von Reden 2011, 426). As many were granted land, it was likely they would farm it according to the practices of their homeland (Thompson 1999b, 128). The *dioikētēs* Apollōnios, for example, is recorded to have

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Kemp 2006, 172), to such an extent that Herodotos (2.77.4) falsely believed that there were no vines in Egypt. Even in the Fayum, beer-brewers were more common than wine producers under the Ptolemies (von Reden 2011, 428). This situation continued well into the Roman period (van Minnen 2001, 1266-1267). In relation to oils, it appears that the use of the traditional Egyptian varieties (castor, sesame, radish, and sesame) was not even supplanted in the later Roman period (van Minnen 2001, 1267). Olive oil is not mentioned in the Revenue Laws papyrus, which, as detailed in CHAPTER 3.2, deals extensively with the vegetable oil industry. I discuss this overall topic further in CHAPTER 5.1.1 in relation to foreign trade and self-sufficiency.

planted 10,000 vines on his *dōrea* (*PCZ* I 59159) in the Fayum. Strabo (17.1.35) notes that it was particularly in the Arsinoite nome that wine and olive production took place in his time, demonstrating the influence of Greek settlement there. Although scholars have linked this increase in production with high customs duties (Rostovtzeff 1941, 355; Fraser 1972/1, 150), we cannot be sure that they were a factor here; there is no necessary relationship between this expansion of wine and oil cultivation and high customs duties. We can also compare these customs duties with the taxes levied on the sale of substitute goods produced locally. The rate of 25% on the license to sell honey (*PSI* V 510) and to catch fish (*P. Tebt.* III.I 701) is consistent with the 25% tariff rate on certain goods, including honey. This was advantageous to the producer with lower transportation costs, if we consider other costs roughly the same. This might have favoured local production for consumption in the immediate geographic area. I discuss this further in CHAPTER 5.1.1.

In CHAPTER 3.1.6, I drew attention to the possibility that importation was contracted out in the same way as other economic activities were. If this was the case, these contracts must have been generally profitable, or no one would bid for them and the state could not draw a revenue from them. This likelihood points to the effectiveness of the duties for revenue collection, and explains the evidence of importation attested in *PCZ* I 59012 and *PCZ* I 59015-R despite high customs duties, which many have seen as preventing the importation of goods (Andréadès 1932, 19; Rostovtzeff 1941, 385; Préaux 1947, 58; 1954, 322; Fraser 1972/1, 150; Sidebotham 1986, 9-1; 2011, 34; Sijpesteijn 1987, 1-2). We can possibly understand the historical anomaly of these extremely high tariff rates as follows: even if the importation of goods without a contract might have been generally unprofitable, the prices at which the state bought goods sold by contractors could have compensated for the cost of the high duties. I noted in CHAPTER 3.1.6 that the shipment in *PCZ* I 59015-R paid a tariff to the state on its importation, while also receiving payment from the state for the sale of its cargo into royal storehouses. I suggested that this might have been due to the need to fulfil two separate contracts: one for importation and one for customs duties collection, and that the payment from the state possibly reimbursed the customs duty paid. If this was the case, it would give an advantage to these contracted parties in importation, while still allowing for further revenue through collection of duties on

merchants without contracts. It might seem in this system that the toll-collectors would serve little purpose, since it implies the state paid for much of their tolls through reimbursements. Their collection of high customs duties, however, would have enforced the monopoly of merchant contracts, since we would expect that only contractors could have generally paid the tariff and still have sold at profit. Such a system, though speculative, would explain the importation of staples despite historically high duties, without having to assume enormous demand and profitability.

4.2 THE EFFECTS OF STATE CONTROL OVER PRODUCTION

Significant state influence over the distribution, use, and control of factors of production had important effects on the structure and operation of the economy.[23] The measures prohibiting unapproved parties from the use of capital goods, placing them instead into state hands, allowed the state to dictate the terms on which production requiring these capital goods would take place. Consequently, the state had a significant role in deciding the quantity of output, the quality of the product, the selection of the producers, the wages or salary falling to these producers, the selection of retailers, and the prices of finished goods. We see the central example of this arrangement in the industries contracted out to *telōnai*, attested in most detail for vegetable oil production *(P. Rev.*, cols. 38-72). As seen in CHAPTER 3.1.5 and 3.2, the production goods required for this arrangement, chiefly seeds (*P. Rev.*, cols. 39-44) and presses (*P. Rev.*, cols. 49-50), were strictly controlled by state officials and could not be employed by unauthorized parties. Even authorized parties were required to follow the state's guidelines on the use of these goods.

The state control of capital goods in this instance must have extended beyond the final stage of the production process, when consumption goods were manufactured for sale to the market. Since the state monopolized the capital goods required for this production, it seems likely that the state must also have strictly controlled and directed the manufacture of those capital goods. The state had to

[23] For the definitions of factors of production, capital goods, economic calculation etc. used in this section refer to CHAPTER 2.2.2-2.2.3.

eliminate any possibility of household use or a market in these goods for their prohibition to have been effective. Therefore, further state direction for their production and upkeep was required. Thus the references in the sources to monopoly industries in consumption goods do not provide us with the complete picture, since further state control of higher order production is implied. This higher order production would in turn require the supply of further production goods, some of which might have required further contracting out for their own production.

It is notable that the temple corporations, despite being in royal and religious ideology proxies of the pharaoh as head of the priesthood (Sauneron 2000 [1957] 30-32; Evans 1961, 152-153), were not exempt from these prohibitions. This is important, as temples could hold significant concentrations of wealth (Rostovtzeff 1941, 280; Sauneron 2000 [1957] 32-34, 52-54; Bjerre Finnestad 1997, 232; Manning 2003, 77; Clarysse 2010, 279-281). They would, therefore, have been the parties outside of the state administration with the greatest purchasing power to invest in capital goods as a means of long-term production and profit. This loss of ownership of industrial capital goods, which were brought under state control under Ptolemy II (*P. Rev.*, cols. 49, 51), required a shift on the part of the estates away from industrial production and towards agricultural production. This would have impacted on the structure of the economy even if this production was purely for the household, as temples would no longer have to purchase the same quantity of these agricultural goods as they had formerly bought through the profits of their industrial production. Since these were the most economically significant units apart from the administration, regulation both tightened the state's control over industrial production and rendered its production more uniform.

Direct state control and direction of capital goods extended well beyond the monopolization of complex presses and other tools required for industry. The supply of the seed crop by *sitologoi* to Crown tenants (Préaux 1939, 119-120; Rostovtzeff 1941, 280; Turner 1984, 149-150; von Reden 2007, 205-210), as well as other tools and traction livestock required for the sowing and harvesting of crops as part of the *diagraphē tou sporou*, are all examples of this arrangement in the agricultural sphere. This situation allowed the state to determine to a significant extent the types of crops grown in its domain, though as noted this was directed at the local level. Although the capital goods required

for these economic activities were not monopolized, it seems that the state nevertheless tended to maintain production of these capital goods to ensure supply to the next order of production. The existence of the royal herds of cattle (*P. Tebt.* III.I 703, 64-66), for example, testifies to this. But the possibility of a market in these capital goods remained, even if supply was controlled by the state through its own contractors. Thus state control over capital goods extended over an even more significant extent of the economy than that which is immediately demonstrated by the sources, when we consider the production of even higher order goods. By this means, the development of a market in these producer goods was reduced to the extent that the state supplied these goods to producers through its own contractors, especially in relation to the goods that the state prohibited outright.

This state control of production also came through indirect effects of policy. In the first place, we can look at the possibility for private parties to invest in those capital goods that could be legally owned. In this connection we can consider the population's purchasing power. I noted in CHAPTER 3.1.3 that the harvest tax falling upon Crown tenants, who formed the bulk of the peasantry, amounted to around half of their annual production (Préaux 1939, 133-135; Rowlandson 1985, 328; Monson 2012a, 172). In addition to this, all adult inhabitants of Egypt both male and female were required to pay the salt-tax and engage in compulsory labour, each equating to around half a month's worth of work for the agricultural household (Muhs 2005, 10; Clarysse and Thompson 2006/2, 46-47). This meant that altogether the Crown tenant had to cover all his annual expenses with what he was able to produce in less than half a year. This in turn meant that Crown tenants had relatively little means to invest in capital goods for a long-term return on production. The state, on the other hand, drew on the revenue gained from the rents paid to it by tenants, allowing for the expansion and maintenance of its own capital stock and increasing its ownership further. The result was that the proportion of capital goods in the economy under state control as against those owned outside the administration was relatively increased, even without specific regulations on their ownership.

We can also view the arrangement of Crown tenancy itself, in which the state furnished the capital goods required for the agricultural production undertaken, as incentivizing these tenants against investments in capital goods. Since the state established itself as the owner and administrator of

production goods, the initiative of the peasantry was not necessary. It is therefore likely that the relations between tenant and landlord further increased the state's share in the ownership of total capital goods simply by the specific rights and obligations demarcated by them. Because it was expected that the state owned and provided the capital goods with which its tenants would engage in production, it can also be suggested that any capital goods these tenants accumulated could be confiscated if required for some other use, as in the case of the requirement in *P. Rev.*, col. 49 for all owners of presses to hand them over to the state. This possibility would have established even more fully the relations between the tenant and landlord as labourers and owners of capital goods respectively. We can see, therefore, that the state restricted the market in capital goods by reducing the ability, possibility, and incentive for such a market to develop. As capital goods were managed by the administration, the capital stock of the country was largely known to the state at local levels and this provided the state an indication of its wealth, through its ability to assess changes in the quantity and quality of capital goods. This also tied the fortunes of the king's household to those of his subjects, as both his revenues and their livelihoods depended on an efficient management of capital goods.

The importance of state control over factors of production is demonstrated by the position it held in deciding their uses. This included the quantity and types of capital goods to be employed, the specific deployment of labour, and the selection of goods to be produced, in which ways and in what quantities. Since this decision-making took place within a single unit owning these capital goods, even if on the local level, it was based on a centralized, household direction of production. We can distinguish this from a decentralized direction, which would exist in the direction of capital goods by market demand. By referring to this as centralized, I do not mean that all directions came from a single, higher bureau, but that production goods and labour resources were transferred to different activities based on the decisions of officials (at whichever tier) of what was ultimately a single organization rather than through trade between different parties. As mentioned in CHAPTER 3.1.1 and 3.2, both the direction of agricultural production in the *diagraphē tou sporou*, and the direction of industrial production as attested in *P. Rev.*, appears to have carried out at the nome level. Obviously

this did not prevent the allocation of all capital goods by the market completely. The important point is that the general control of capital goods and the direction of their use were in the hands of the state. This is especially significant in relation to the more complex forms of capital goods employed in industrial production, which Ptolemy II brought under the direction of the *telōnai* as well as the *oikonomoi* (*P. Rev.*, col. 46). In addition to this control of capital goods, the state had the preeminent role in the allocation of labour resources, first in relation to compulsory labour, but also through the state's extensive access to stores of grain (Thompson 1983, 64-65; Manning 2003, 139) for use as payment. The ability to keep this stock was a result of the harvest and land taxes in kind, and it was partly through this that the state could attract and retain the labour force of the country. State control over factors of production, therefore, was increased further by that means.

The organization of factors of production included decisions concerning the particular kinds of goods that would be produced, their quantity and quality, as well as, importantly, the particular combination of factors involved in their production, their quantity and quality. This required access to relevant information concerning these production processes and staff capable of coordinating the various uses of the factors of production. Customary methods would have been involved in production, but the capacity for various combinations of productive factors remained. State agents had to decide which particular factors of production to use and in which combination, their quality and quantity, and how these would be acquired. For example, even something as simple as the means of moving water from one place to another as one part of a process of production could be achieved in various ways, with different methods being more or less capital- or labour- intensive, and requiring different forms of labour or capital goods.

In order to understand this situation more fully and to explain its implications on the operation of the economy, a key distinction must be pointed out between the conditions that prevailed as a result of the organization of the factors of production along these lines, and those where their organization was based on a market in them. In the latter case, the existence of prices would allow for a direct comparison between the costs of factors of production, since price acts as a common unit between them (Rothbard 2004 [1962], 606-609). Without price or a similar common unit through which to

assign factors, such a comparison cannot be made. The administration did set factor prices within its monopolies, for example for the sale of seeds to the oil workshops (*P. Rev.* 39). But since these prices and the cost were set by the state, they did not carry with them the information of a market, and functioned as payment to the producers rather than as market prices.

This leads to the conclusion that, lacking a common unit through which the state could compare the various uses of the factors of production, organization by the state could not occur on what can be described as a rational basis, but by necessity had to be undertaken through trial and error (Mises 1998 [1949], 700). This does not imply a lack of reason behind this process, i.e. that they were without purpose or necessarily without intended effect, but merely that there was no possibility of accounting for the efficiency of the direction of factors of production. The latter required a common unit of account between these factors. The result was that the agents responsible had to make their decisions with little certain information. It is not unreasonable, therefore, to expect a tendency towards using traditional methods, and a lack of innovation in addition to a relatively inefficient means of allocating factors of production. The advantage in this system and one reason for its development and perpetuation, might have come with a reduction in transaction costs that resulted from the state's establishment of the production process and the direction of the involved parties.[24]

We can expect that, as a result, the state was required to ensure a constant store of certain capital goods, needed to produce lower order goods, through investing in these capital goods or contracting out for them. This is because, with the market in a variety of capital goods relatively undeveloped or prohibited, it is likely that these capital goods could not be acquired on the market at short notice. Their procurement instead required a further degree of organization by the state to ensure a source that could be called upon when needed. This is demonstrated by the state store of presses for the production of vegetable oil. The large stores of tools required for labourers on the reclamation projects in the Fayum (*P. Petr.* III 43) also likely illustrate the need of a store of state-owned goods to

[24] See Silver 1995, 4-72 on the role that states and temples had in early economies in creating institutions that facilitated economic activity in the face of high transaction costs.

be kept as a reserve for future projects. The inefficiencies of holding this stock could be lessened through renting some of it out, seen for instance in the royal herds of pigs and geese (Rostovtzeff 1941, 293-294). The estimate for the necessary quantity and quality of capital goods was another complex task required of the administration. The burden of the cost of errors in forecasting, either investing too much or too little in their acquisition, therefore fell upon the finances of the state.

As information about the best uses of production goods could not generally be afforded through market prices, it had to be acquired by other means. This required officials, especially interested parties such as the *telōnai,* to become familiar with these economic activities. Therefore, we can expect that the direction of production in this economic system, of necessity, devolved to a local level, where less information was required for a relatively efficient direction of factors of production. The central planning of all the production of the realm by the office of the *dioikētēs* would have tended towards exacerbating the inefficiencies of this household organization. The concept of state-planned organization of agricultural and industrial production has long been superseded in favour of local management (Bingen 1978a, 178-179; Manning 2003, 154). I suggest that this was regarded by the central authorities as more economically efficient.

4.3 THE EFFECTS OF STATE CONTROL OVER RETAILING

We must also consider the economic effects of retail licenses, which formed another part of the state's control over the economy. In *P. Rev.*, cols. 47-48, for example, we see that the products of the monopoly workshops were sold to designated retailers, and I have already mentioned the licenses for the sale of other goods such as honey and fish in CHAPTER 3.1.5. This arrangement allowed the state to decide which goods were to be sold legally to the market. This aided in the monopolization or control of the production of goods, since it helped to prevent the legal sale of illegally produced goods, by either preventing their sale completely (e.g. in the case unauthorized importation of oils), or by supervising the sourcing of the retailers' goods. It also perhaps helped to ensure the sale of certain

goods by outlawing products that might compete with those sold by licensed retailers in the same market. In this way the state had a degree of control over its subjects' items of daily consumption.

We can expect that the effect of the regional monopolization of retailing was to drive the sale price, where set by vendors, to the point at which the highest possible profit would be gained, unchecked by competition in the market. This of course does not mean that the price could be raised indefinitely, since the reduced volume sold as a result would in turn reduce the income gained by the vendor. The lack of competitors who could undercut this price, while still making a sufficient profit, meant that the price would remain high (Mankiw 2012, 303-304). Of course, these retailers had to pay for their license to the state, and a tax on the sale of their goods meant that much of their profit likely fell to the state.[25] This is a similar situation to customs duties: the state focused on capturing high profit margins. Through licensing regional contracts for retailing, the state could have maximized its profit by restricting supply, resulting in a high bidding price for these contracts.

Even for retailers who held a monopoly for the sale of some goods, a form of competition nevertheless existed: other retailers could sell goods in the same class, e.g. foodstuffs, which could be used as substitutes to other kinds. This probably reduced the monopoly price, and from the perspective of the consumer mitigated the effect of the monopolization of retail. Not all prices were determined by the state (*P. Tebt.* III.I 703, 174-183), possibly leaving some space for this kind of competition. The ongoing viability of retailers was probably based not only on the profits of sale, but also on the ease these retailers had in securing licenses, especially considering the importance of personal relationships in Ptolemaic institutions (Crawford 1978, 199; von Reden 2007, 294; Manning 2010, 157). The ability to gain or retain licenses not only had a monetary component, but was also influenced by social, political, and economic connections with the administration, both in official and unofficial (i.e. corrupt) terms. We can compare this with the personal relationships upon which securing of loans were dependent (von Reden 2007, 294). Economic efficiency, therefore, might not

[25] On the taxes paid for these licenses, such as those on honey and fish, see the outline in CHAPTER 3.1.5 and the discussion of the rates, compared to those of the customs duties, in CHAPTER 5.1.1.

have been the only consideration in granting these licenses. This arrangement allowed the state to organize retail trade as it desired, which, in turn, ensured that its operation conformed to the wishes of the administration, regarding the sale, quality and movement of goods, and the choice of personnel. The state perhaps viewed it as important to monitor the manner in which business was conducted and to ensure that only those approved by the state, the king's agents, could engage in it.

4.4 THE EFFECTS OF STATE CONTROL OVER COINAGE

Important benefits came to the state through its control over coinage. The monopolization itself prevented competition both from internal and foreign parties. The state, being the first issuer of money, could make use of these coins at their initial purchasing power, despite the injection of new coins into the market (Horwitz 1994, 403). This would have an inflationary effect, since the increased supply would eventually lower the value of the coins against all other goods on the market, through the consequent rise in prices *ceteris paribus* (Mankiw 2012, 15). By this the state was able to avoid the devaluing effects of an increase in the money supply brought about by the issuance of coins, and that the burden of this devaluation of the currency fell upon other parties who held such coinage. Because competition in issuing coinage was prevented, employing foreign coins to avoid these inflationary effects was not possible, allowing for a continued demand for Ptolemaic coins. Obviously wealth could be shifted to other forms, such as bullion, in an attempt to avoid this ongoing devaluation. Since by this time coins were common for payment (von Reden 2007, 65), and composed of metals which were traditionally held as stores of wealth, this was perhaps less likely to occur.

The state's monopolization of currency within Egypt, and the popularization of coins as the customary form of money meant that a shift of the price of coinage out of line with the market value of the metals could occur, signifying the importance of the nominal rather than the real value of coinage. The term 'seigniorage' refers to the gains to the minter resulting from a difference between the face value of coinage and the market value of the materials that make up this coinage. As Mundell (2002,

11-12) notes, seigniorage requires the monopolization of currency, and in the ancient world this overvaluation of coinage tended to appear where states had strong influence over the economy. We see that there was potential for seigniorage at least in relation to the ratios between gold and silver in Ptolemaic coinage (von Reden 2007, 41). The extent of this phenomenon in relation to copper coinage is difficult to estimate, due to the lack of basic information on the nominal values of coins and prices (von Reden 2007, 61-2). Therefore, we cannot be certain that nominal values were relevant in the exchange of coins. Von Reden (2007, 69), however, argues that the metallic value of coins was probably of little significance before the end of the reign of Ptolemy III. Lorber (2005, 137-138) points to the introduction of additional denominations of bronze coinage under Ptolemy II as an attempt to increase the population's confidence in it as a fiduciary substitute for silver coinage. The exchange of coinage based on nominal values, therefore, added to the state's gains by enabling it to be set above the cost of minting. It furthermore allowed the state to use cheaper metals, such as bronze, to a greater extent. We can also point to the fees charged for changing coins on entry into Egypt (*PCZ* I 59021; Bagnall 1979, 176 n2) as a further means of profit through this currency control.

In addition, the monopolization of mines by the state allowed for metals to be channelled into the manufacture of coinage so that the state might gain even further value from minting through cutting out the middle-man. A disconnect between the nominal and the metallic value of coins would mean that an even greater profit could be drawn from control over the production of these metals, simply by striking these metals as coins. The Ptolemies had good access to gold mines in Nubia and within Egypt itself (Rostovtzeff 1941, 381-383; von Reden 2007, 42), and copper could be sourced from Kypros (Rostovtzeff 1941, 339). The gains to be had from this were necessarily limited, as silver had to be imported (Rostovtzeff 1941, 386); however, bronze coins were the most prevalent, especially in the *chōra* (von Reden 2007, 58-62), with their circulation increasing from the reign of Ptolemy II (Lorber 2005, 137).

Monetization within the Egyptian economy has been seen as the result of taxation in coin, rather than as a development driven by the market (von Reden 2001, 66; 2007, 251; Clarysse and Thompson 2006/2, 8, 347; Manning 2010, 133). We should consider this monetization as the spread of coinage

in terms of the use of coin in state budgets and its employment as a common means of exchange, rather than as the introduction of money altogether (von Reden 2007, 31; Manning 2010, 130-131). An important reason for the emphasis by the Ptolemaic government on the use of coinage can be seen in its origins as a Graeco-Macedonian state (von Reden 2007, 32). Coinage was required for employing subjects who expected payment in coin, particularly for mercenaries (von Reden 2007, 33, 56), foreign trade and gifts. Certain advantages of the use of coinage as a form of money have been discussed in CHAPTER 2.2.4 and do not need to be repeated here. The spread of the use of coinage extended its benefits throughout the Egyptian economy. Consequently, market exchange was facilitated throughout Egypt.

It has been suggested that the state increased the use of coins as money in the economy most importantly through the imposition of taxes in coin (von Reden, 2007, 251; Thompson 2008, 29; Manning 2010, 133), especially through the introduction of the salt tax under Ptolemy Philadelphos, which fell on every adult male and female in the realm. As taxes were levied in coin across the native population, it was imperative that they be procured, if we assume tax-payers were cooperative. This, however, says little about the use of coins as money. If we take this policy as the sole impetus for the popularization of coinage, coins would have been tokens used by the state to calculate the payment of taxes and other elements of its finances; although it would have created some demand for the purchase of coins, there would be little reason to hold large amounts of these tax payment tokens if that is all they were. Thus there would have been little reason for parties who already had enough coins to pay the tax to accept them in the market, unless they expected to trade them forward to those who still required coins for the tax. Some demand for coinage would have been created in this way, but the low value of broad-based monetary taxes means that this would have been necessarily limited. The salt tax at its introduction in 264 was only the equivalent of nine days of work for an agricultural labourer (Muhs 2005, 10). The rate of this taxation was also lowered in 254 and again in 243 (Muhs 2005, 10). Other tax payments in coins, such as the *apomoira* tax, applied to a far smaller section of the population. Moreover, credit towards the salt tax was sometimes given for labour services (*P.*

Petr. II 4; von Reden 2007, 278), meaning that this new monetary tax did not completely replace the system of *corvée* labour.

Since tax-payers would need only a small number of coins, once per year, it does not seem likely that the salt-tax would have generated enough demand to make coins so marketable as to be generally accepted as money, if we ignore the value of their metal content. That these coins were made of metals already in demand as a medium of exchange, in combination with their use in paying taxes, might have provided a motivation for the wider use of coinage. But to point to the imposition of these particular taxes as the cause of this monetization is to isolate the less important factor in its development. It seems, then, that there is some reason to doubt the attribution of the wider popularization of coinage to imposition of taxes in coin. We can probably explain this more accurately by pointing to the genealogy and economic advantage of this currency, as discussed in CHAPTER 2.2.4 and above. I discuss whether or not the state imposed these taxes to monetize its realm in CHAPTER 5.2.

4.5 THE EFFECTS OF STATE CONTROL OVER PRICES

As mentioned in CHAPTER 3.1.5 and 3.2, the administration had control over setting some, but not all prices of goods for sale, as is implied in *P. Tebt.* III.I 703. State control in this area is demonstrated most clearly in the final sale of the product of the monopoly on vegetable oil (*P. Rev.*, col. 53). The various kinds of oil, having been delivered by the *oikonomos* to the approved retailers, were only to be sold at the prices specified by the state's agents. Here again we see that these agents were taking on entrepreneurial activities in the economy, attempting to set the prices of goods towards a forecasted result, for example the maximization of revenue to the state. Interestingly, the relative qualities of the oil did not correspond to their relative prices (Bingen 2007, 180). This meant effectively that higher quality oils were cheaper than those of a lower quality, but not necessarily cheaper than they would have been if these prices were not fixed by the state. If these goods were bought on a first come, first served basis, the higher quality oils would presumably be bought in preference to the lower quality

oils, resulting in a shortage of the former (Krugman and Wells 2009, 81; Mankiw 2012, 113). In such a scenario it might be expected that the higher quality oils were secured by those who held privileged positions connected with the state, especially since the retailers of these oils were themselves beholden to the state.

It is not possible to make a comparison between the prices set by the state for these goods and their market price, but the effects of a significant divergence from what would have been the market price can be briefly noted: if the state lowered prices through these regulations, it was subsidising this product, allowing for wider use, while bearing the cost. If they were significantly raised above the market price, the state restricted the use of these oils, still bearing the cost. We can imagine that any deleterious effects of these fixed prices could have been noticed. The setting of excessive prices in relation to supply and demand would have resulted in a glut of goods, requiring the state to lower the selling price in order to liquidate them. Likewise, shortages of goods would have been apparent. Since both the state and the *telōnai* stood to gain by increasing the price in accordance with this demand, we can expect that artificially low prices could not have prevailed for long. For these reasons, we cannot posit too much of a discrepancy between prices set by the state and would-be market prices, apart from the monopoly effects explained in CHAPTER 4.3.

4.6 CONCLUSIONS

The purpose of this chapter was to explain the most significant effects of state policies on the economic activity of Egypt. The results posited above can be summarized here. In relation to customs duties, I detailed the implications of the established view that high rates on importation restricted the volume of these goods entering Egypt where a locally produced substitute was available. If this was the case, it required shifting production within Egypt, as a response to the demand for these goods in lieu of their importation, which perhaps reduced the specialization of economic production in Egypt. This ultimately reduced the relative gains from trade, and relatively restricted the wealth of the country. On the other hand, the attestation of importation in the papyri demonstrates that it

occurred despite these high tariff rates. This means either that demand for these goods was very high, or that the previous understanding of this policy is faulty. As an explanation for this, I suggested the possibility that state contracts for importation allowed for regular importation despite high customs duties.

The state was shown to have held the ownership of or control over the production goods of Egypt to an extremely significant degree. This occurred not only through specific state actions intended to limit the ownership of certain capital goods by non-state parties, but was also a result of economic policy, not necessarily undertaken for this purpose. That the state controlled the capital stock meant its officials were charged with organizing and managing the process of production, resulting in a fundamentally different organization of capital goods than under market exchange. The direction of factors of production, therefore, had to take place on the local level.

CHAPTER 5: THE AIMS AND ORIGINS OF PTOLEMAIC ECONOMIC POLICY

In CHAPTER 5 I investigate the purposes and aims of economic policy. This discussion is informed in particular by the analysis of its economic effects as explained in the previous chapter. This provides a new means of understanding Ptolemaic political economy, allowing us to consider which effects of these policies, if any, might have been viewed as beneficial. It is possible that these could illustrate the aims of these policies. We cannot, of course, assume that this identification of effects offers any certain link with state aims, but considering the relationship between purpose and effects might still provide some insights. Through this I hope to expand our understanding of policy's aims by considering the results of this analysis of economics effects. To expand on this point briefly, I do not claim that officials necessarily understood the results of state actions in all their detail, nor that each of these actions necessarily worked as intended. The focus of the question is the purposes of these policies in the event that the intentions and results were concordant. This inquiry is particularly pertinent in relation to the findings of CHAPTER 4, suggesting that some of the economic policies tended towards constricting production and had problems in economic calculation. In relation to this, we can ask whether we can understand these effects as being purposeful, or whether we should understand them as unintended, stemming from errors of the administration.

Although we cannot assume that officials could know all effects, there is reason to believe that an understanding of them could have been arrived at in some cases. As mentioned in previous chapters, questions of cause and effect in relation to raising revenue had been considered by Greek writers of the 4th century (Xenophon, *Poroi*; Pseudo-Aristotle, *Oikonomika* 2), and so we can expect that similar questions were raised by Ptolemaic officials. The administrative traditions of the Egyptian state also undoubtedly provided its own understanding of economic cause and effect, bound up as it was with the direction, assessment, collection, and allocation of economic goods. As part of this discussion I consider the origins of Ptolemaic economic policy, as debated, and which have been linked with both Egyptian and Greek traditions. A key consideration in this is whether we can see any consistency in

the effects of policy, or whether there are clear contradictions in them. I do not intend to look at every state action, but rather to focus on the most important aspects of policy and to consider what consistency can be found in them, both in the means of carrying them out, and in their effects. To give a brief outline, in this chapter I consider trade policy, state control over the coinage, retailing, and production, and the creation of a new elite class in Egypt.

5.1 THE AIMS OF PTOLEMAIC TRADE POLICY

5.1.1 PROBLEMS IN ATTRIBUTING MERCANTILIST OR PROTECTIONIST AIMS TO PTOLEMAIC TRADE POLICY[26]

Ptolemaic trade policy, as detailed in CHAPTER 3.1.6, seems to have been based on the collection of tariffs at high rates, with trade possibly conducted on the basis of merchant contracts in line with the general nature of the tax-farming contracts of Turner's (1984, 151-153) Model II. Unauthorized parties were also prohibited from certain kinds of importation (*P. Rev.*, cols. 52-53). A high representation of trade between Egypt and subject and allied regions was also apparent, implying special privileges similar to those of the local monopolies. Importation seems to have been a special privilege allowed to certain ports such as Alexandria and Pelusion, suggested by *P. Rev.*, cols. 52-54 and *PCZ* I 59012. All importation of goods for personal use was subject to the payment of high customs duties, and we can expect that the merchant contracts came with a tax at a significant rate (see below for a discussion of rates of tax-farming contracts). Due to the reduction in importation that might have come from these arrangements, as discussed in CHAPTER 4.1, Ptolemaic trade policy has been seen as a means of limiting export in order to increase the production of goods within Egypt, i.e. as a protectionist or mercantilist policy (e.g. Andréadès 1932, 19; Rostovtzeff 1932, 748, 768; 1941,

[26] Regardless of what these terms specifically mean in economic theory or history, it seems that in relation to Ptolemaic trade policy both have been used (e.g. Rostovtzeff 1932, 748, 768; 1941, 296, 355; Préaux 1947, 58; 1954, 322) to refer to a policy limiting importation in order to stimulate local production, and here I use them in that connection.

385; Préaux 1947, 58; 1954, 322; Fraser 1972/1, 150; Sidebotham 1986, 9-11; Sijpesteijn 1987, 1-2).[27] The aim of this was supposedly the prohibition of the importation of certain goods to prevent the sellers of those goods from competing in the market with local producers. This would have allowed a relatively increased local production of these goods, in order to fulfil the market demand for them (Rostovtzeff 1941, 385). Rostovtzeff (1941, 351) in particular emphasized the aims of this policy as the desire for self-sufficiency in consumption goods, and the export of locally produced goods to increase the amount of gold and silver circulating in the realm (cf. Andréadès 1932, 20; criticized by Sidebotham 1986, 10). There have been some distinctions in this conception of this mercantilist policy. Orrieux (1983, 57) noted that these duties were compensatory rather than protectionist, since their rates matched local ones; Rostovtzeff (1941, 355) had already suggested that duties could have been either compensatory or protective. Préaux (1939, 378; 1954, 322-323) noted that tariffs were not for the protection of local industry, but for the protection of the tax-farming contracts from competition. This suggestion accords with the clear attempt on the part of the state to include monopolies in these contracts, but still must account for the possible inconsistencies presented below.

The prohibitions and high tariffs comprising this policy have already been described in CHAPTER 3.1.6 and their effects explained in CHAPTER 4.1. In light of this, it is clear how the reduction in importation likely resulting in those policies, as well as the further effect of increase local production, could be taken as beneficial for the state and seen as the purpose of this policy. This aim is further suggested by the overall parallels between Ptolemaic economic policy and that of the mercantilist states of the Early Modern period (Heichelheim 1970 [1938], 186), seen in the sale of monopolies, the state directed development of infrastructure, and the apparent emphasis on self-sufficiency (Ekelund and Tollison 1997, 111-113, 256).

We cannot, however, simply assume that likely effects and modern parallels prove that the purpose of this trade policy was the deliberate limitation of importation as a means of increasing local production.

[27] As noted in the CHAPTER 1.1, trade policy has not been a major focus of recent scholarship on the Ptolemaic economy.

In fact, certain features of this program and its possible lack of consistency with internal policies cast doubt on the idea that it was motivated by mercantilist or protectionist concerns. I propose further to show that such an aim of this policy cannot simply be assumed, by suggesting an alternate understanding of the Ptolemaic stance on importation. My own understanding, though not entirely contradictory with previous opinions, sees this trade policy, apart from economic aims, as based in part on diplomatic concerns, if we must assume that the height of the tariffs proves that revenue could not be its goal. This is not to discount the mercantilist or protectionist suggestions of previous writers completely, but it is rather to note the contradictions in this approach offered by the evidence, and to explain this policy in light of those apparent contradictions. Turner (1984, 152) noted that conceptualising this policy as mercantilist 'requires a leap in the chain of evidence'. Here I present evidence showing this mercantilist attribution to be problematic.

To be more explicit, we can point to the following possible inconsistencies within a protectionist conception of this policy: (1) the continued importation of consumption goods despite this policy, (2) the existence of barriers to the movement of goods within the Ptolemaic realm, to which we cannot attribute a protectionist goal, (3) the similarity of different customs duty rates to local tax rates, which we cannot suppose were intended to create the same incentives as a protectionist policy. In addition to this, trade seems to have been organized on similar lines to tax-farming, and so we must question whether there would have been such different aims between these two aspects of policy. I discuss these three possible inconsistencies and offer my own understanding of their purposes.

First, it is clear from the discussion of trade in CHAPTER 3.1.6 that self-sufficiency was not achieved, and that foreign consumption goods were required, for example, by the population of Alexandria. The high customs duties or taxation of contracted merchants might have limited the amount of importation, but they did not prevent it. Since importation was indirectly limited but not prohibited, if the state aimed at protecting local production, it employed a moderate policy and did not attempt to ensure this result completely. This is all the more telling due to the existence of prohibitions on importation, attested in *P. Rev.* col. 52 but also suggested by the fact that certain states seem to lack representation in the import trade, with trade dominated by the subjects and allies of the Ptolemies, as

noted in CHAPTER 3.1.6. Why the Ptolemaic state might pursue this end yet still allow a degree of importation must be examined. It could be argued that this was in accordance with a certain hierarchy of values: that the benefits of collecting revenue from these high tariffs could have been seen as lucrative enough to allow the importation of goods in this instance, while still preferring the protection of local industries in less rewarding circumstances, e.g. high tariffs could have been seen as preferable to prohibition, which was seen as more beneficial than low tariffs. The state could have allowed a small degree of importation as long as each item imported was highly profitable. While this is possible, its complexity raises the question of how this was calculated, as well as how it was restrained merely by the use of customs duties. The existence of various tariff rates depending on the type of goods makes such a rationale even more doubtful, since, under this understanding, each must have had some deliberate incentive behind its rate. It would suggest, for example, that the state used this policy to encourage the local production of honey, but not to as great an extent as it did in relation to wine, as the tariffs on wine were greater than those on honey (*PCZ* I 59012; Andréadès 1932, 17). Rostovtzeff (1932, 768) approached this idea by suggesting that the lower tariff rate on imported wool was meant to facilitate its supply to the rug, mattress, and pillow industries, despite the fact that at 20% *ad valorem*, it was still very high by historical standards (see TABLE 7, in CHAPTER 4.1). Bresson (2012, 81-88) argues that the highest tariff rates of 50% were levied on goods associated with luxury, suggesting these rates were based on philosophical values and the use of these imports by the wealthy. This could also demonstrate the high demand for these goods amongst the elite as items of status, which might have allowed for higher duties on their greater profitability.

Of course, if we view these tariffs as exacted primarily for purposes of revenue, the effectiveness of their rates towards this must be questioned. On this, see the discussion of revenue and tariff heights in CHAPTER 4.1. I simply repeat here that it seems likely that lower tariff rates would be more conducive to an optimum collection of revenue. Andréadès (1932, 26) considered it doubtful that the Ptolemies would forego such an income in this way, hence the idea that another purpose lay behind this policy. We cannot, however, assume that revenues were so greatly compromised by the heights of these tariffs or, if they were, that the policy makers knew this. The fact that the duties did not

prevent importation, and that revenue was still collected, might have been a sufficient signal to the state that this policy worked in accordance with an intended collection of revenue. If the rights to these duties were auctioned off, we would expect that they must have provided a reasonable return. The level of customs duties might not have even been directly based on an accounting of the revenue collected from them. On this, see the discussion below of the similarity between tariff rates and those of local taxes.

It seems that importation was allowed if not exclusively then primarily to Alexandria and Pelusion, and so this possible inconsistency might have existed for the most part in relation to urban consumption. The point is nevertheless significant. Alexandria represented the largest population centre, and as the seat of the king's power and a major site of building programs, was likely a source of high per capita wealth and market demand. Pelusion was the necessary entry point for eastern traffic, where the movement of goods could be controlled relatively easily.

The second possible inconsistency in a protectionist conception is seen in the existence of trade barriers on internal commerce within the Ptolemaic realm. Tolls and charges were levied on the transportation of goods within Egypt, and tariffs and prohibitions were applied not only to importation from foreign states, but also to regions subject to Ptolemaic control, for instance, the importation of various goods from the Levant into Pelusion in *PCZ* I 59012 and the charges on imports of all foreign oil for personal use attested in *P. Rev.*, col. 52.[28] If the purpose of high tariffs was to make their sale less profitable, it seems strange that the state would apply the similar measures to internal traffic.

The cost of internal transport, for example through the use of Nile watercraft, might have been cheaper than conveying goods through longer journeys across the Mediterranean Sea. This would still allow for a local competitive advantage, but we must also take the other high taxes levied by the state

[28] The exemption mentioned here was held by merchants who were likely contracted to work in this capacity, suggested by the receipt that they carried to Alexandria to prove their exempt status. This does not mean that they did not pay some kind of due to the state for their importation, but that it was separate from the customs duties detailed in the document.

into account. As discussed in CHAPTER 3.1.5, these were considerable and can be contrasted with the lower rates of taxes and customs tolls exacted by Greek city-states (Andréadès 1932, 26; French 1990, 31; Möller 2007, 378-379; Migeotte 2009, 50-51). If the taxes levied by the state within Egypt were significantly greater than those levied in the regions that were exporting these goods to Egypt, a degree of competitive advantage would have been held by these foreign exporters. In addition to this, it is possible that greater economies of scale were available to the larger sea-going craft, meaning more cargo could be carried relative to fixed costs. The most common Nile grain boat held about 45,000 *modii*, in Roman measurements, or 306.5 tons (Thompson 1983, 72). The typical seagoing merchantman of Classical Greece on the other hand had a capacity of about 400 tons (Casson 1994, 121). As well as barriers to commerce within Egypt, prohibitions and tariffs were imposed between Egypt and foreign regions subject to the Ptolemaic king, as proved by the duties recorded on goods coming in from Syria in *PCZ* I 59012. The application of barriers between Ptolemaic territories, therefore, casts doubt on the idea that trade barriers were used to hinder the movement of goods to aid production in one region at the expense of the other.

The third possible inconsistency is apparent in the similarity between customs duties levied on importation and taxes on local production. We saw that customs duty rates between 20% and 50% of the assessed value of the good. Within the recorded examples, there are two to focus on in particular: wine and honey. Andréadès (1932, 21-23) observed that the taxes on the local production of these goods appear to have been collected at the same rate as were the tariffs. On different varieties of wine and wine products, tariffs of 33.5% and 50% *ad valorem* were exacted, and on honey 25% (*PCZ* I 59012 col. i, lines 22-24, col. ii, lines 28-32; see Andréadès 1932, 17). The state placed a tax of 1/3 or 1/2 on the local production of wine (*PCZ* III 59326; see Westermann 1926, 42; Rostovtzeff 1941, 354), not including the *apomoira* tax, generally levied at 1/6 of the produce but 1/10 on some kleruchic land (Clarysse and Vandorpe 1998, 23-26; von Reden 2007, 96-97). On honey, the state took in 25% of the produce (Rostovtzeff 1941, 296). The tax rates on these goods, therefore, appear to have been the same as the tariff rates. Despite that fact, and unlike the aims attributed to customs duties, scholars have not suggested these tax rates served to limit the production of these goods. On

the contrary, the state has been viewed as actively promoting the planting of vines and wine production generally (Rostovtzeff 1941, 353; Fraser 1972/1, 166; von Reden 2011, 427). My suggestion is not that the state aimed at hindering the production of these goods within its realm, but rather that the tax and tariff rates were not necessarily set with these incentives in mind. The two rates focused on here, wine and honey, are but two examples of other goods taxed in this way, such as fish, and game (see CHAPTER 3.1.5). The latter carried the same 25% rate (*tetartē*) as honey, the most common rate levied on importation (see TABLE 2 in CHAPTER 3.1.6). Perhaps wine was considered a more lucrative or profitable product, and consequently, taxed at a higher rate. As noted, the equalization of tariff and tax rates has been seen as evidence for compensatory tariffs (Rostovtzeff 1941, 355; Orrieux 1983, 57), aiming at providing a level playing field for local and foreign producers. A simpler explanation is that the state placed the similar taxes on similar goods, regardless of their origin.

The taxation of wine at a higher rate than other kinds of products bolsters the idea that we cannot assume the state aimed at incentive effects in setting these rates. If we can take the vine planting programs within the Fayum as indications that the state promoted wine growing (e.g. the 10,000 vines referred to in *PCZ* I 59159), a view as I mentioned that is uncontroversial (Rostovtzeff 1941, 353; Fraser 1972/1, 166; von Reden 2011, 427), it makes little sense to believe there is a connection between these rates and the creation of incentives. Andréadès (1932, 26) noted that since local wine producers had to pay the *apomoira* in addition to regular taxes, importers of wine carried an advantage over local producers of wine, as far as taxation is considered. The similarity of tax and tariff rates strongly suggests that these rates were set based on the class of good, rather than with a consideration of the incentives resulting from them. This casts further doubt on the idea that Ptolemaic trade policy was based on stimulating local production through limiting importation. With that said, the viability of tax-farming contracts was protected to an extent by these measures, since the rates of taxes and duties were equalized, and certain foreign oils were prohibited (*P. Rev.,* col. 52).

If trade policy was not fundamentally based on protecting its local production, the prohibitions on importation must be explained. This thread is taken up shortly. First, I make two final points on the

possible mercantilist nature of this policy and the aims and reality of economic self-sufficiency in Egypt. As mentioned, Ptolemaic policy has been seen as broadly similar to the European mercantilist policy of the early modern period. The significance of the points I have made about the inconsistency of a mercantilist trade policy is further demonstrated when the dualistic nature of European mercantilism is recognized. This dualism refers to the fact that although mercantilist writers supported controls on foreign trade and the importation and exportation of different kinds of goods, a large degree of domestic *laissez-faire* and free internal trade was promoted (Ekelund and Hebert 1975, 35-36). This is quite different to what is found in the Ptolemaic economy. As was detailed in CHAPTER 3, the state had a strong hand in perhaps all areas of the economy, and the movement of goods came with considerable charges. The possible problem in assuming that Ptolemaic trade policy carried purposeful incentives might have resulted from a focus on one part of the policy without considering possible contradictions. Other apparent parallels to mercantilist policy, such as the use of state monopoly contracts, might have also contributed to the strength of the association between Ptolemaic and early modern trade policies.

As a final point, we should consider how close Egypt came to this supposed goal of self-sufficiency. The supply of olive oil and wine, the two staples of the Greek diet, appears to have required supplementation from outside sources, as the large shipment of imported olive oil attested in *PCZ* 59015-R, and the wine and oil imported in *PCZ* I 59012 attests. Strabo (16.2.9, 17.1.14, 17.1.35) suggests that in the early Roman period, neither of these products could be suitably sourced from Egypt for Alexandrian consumption. Although there are problems in using Strabo's survey of the situation of Egypt in his time, written over two centuries after the reign of Ptolemy II and which does not provide great detail, it nevertheless presents a stark picture that might be indicative of this earlier period. In relation to the olive, he claims that beyond Alexandria, olive trees were planted only in the Arsinoite Nome (Strabo 17.1.35). Strabo considered the oil produced by these olives, however, to be of poor quality. In addition to this, he states that even though there were olive trees planted near Alexandria, oil was not produced from them.

This total lack of olive oil production outside the Fayum is probably exaggerated, since, for example, Agatharkhidēs (83b) claims that olive trees were grown on the Red Sea Coast. It is impossible to establish the extent of olive cultivation purely from documentary evidence. Olives had been grown in Egypt even before the Ptolemaic period (Eyre 1994, 70; van Minnen 2001, 1277). Despite that, the relative abundance of arable land in Egypt meant that oil plants other than the olive could be cultivated there, in contrast to Greece where olive trees were planted on marginal land (van Minnen 2001, 1276-1277). Eyre (1994, 58, n8) argues that it was impossible to create conditions for olive cultivation in areas of natural inundation, making olive oil production a relatively labour-intensive venture. For the Ptolemaic period, Thompson (1999b, 132-133) notes a scarcity of evidence relating to olive cultivation, likely reflecting the difficulties in establishing olive trees. In the Roman period, however, there is ample evidence for the cultivation of the olive and the production of oil in the western oases. In the Kellis Agricultural Account Book, dated to the 4th century CE, both olives themselves and oil were sold as cash crops (Bagnall 1997b, 43-44, 80) We can suppose, therefore, that self-sufficiency in olive oil was not a feature of this period, although further excavations and translations of texts from Mut and Amheida in Dakhleh may change the picture (see CHAPTER 3.1.2).

As for wine, Strabo locates its production outside of Alexandria only in the Arsinoite Nome (17.1.35) and the so-called 'first oasis', i.e. Khargeh and Dakhleh (17.I.42). The agricultural environment of both the Fayum and the oases allowed for year-round cultivation, the former through labour intensive irrigation works required for effectively accessing and draining water (Monson 2012a, 52-54); the latter operated on a similar principle (Mills 1999, 173), with water accessed from qanats and wells that tapped into aquifers. This was likely the reason for the greater capacity for viticulture in these regions, and might explain a paucity of wine production elsewhere in the country where conditions were not so favourable. Similarly to olive trees, vines could not be grown in areas of natural inundation (van Minnen 2001, 1274). The fact that the Fayum was the most clearly Hellenized part of the *chōra* (Bowman 1986, 18; Manning 2003, 109; von Reden 2011, 425-426) likely made the growing of wine even more concentrated there.

Although wine was produced just outside Alexandria through the use of Lake Mareōtis as a water source (Strabo 17.1.14), Strabo (16.2.9) records that in his time most of the wine supplied to Alexandria came from the city of Laodikeia on the Lykos in Karia.[29] This may not have been the case in the 3rd century, especially as Laodikeia was in Seleukid hands, but it nevertheless demonstrates Alexandria's dependence on imports, at a point in time when the demand for wine and olive oil was much more firmly established than in this early period. Since imports of wine from the Aegean are well attested for the 3rd century, it is probable that places such as Knidos, Khios and Lesbos played the role later taken up by Laodikeia. This is further suggested by the lines of Kallimachos (Fr. 399), a contemporary of the period under discussion, in which he pays tribute to Lesbian and Khian wine, stating that they were being brought across the sea in large quantities.

Von Reden (2011, 428), on the other hand, using the figure of the total annual production of wine in the Fayum recorded in *P. Köln* V 221, argues that local production could supply a large number of the Greek population in Egypt (*P. Köln* V 221 is discussed in Clarysse and Vandorpe 1997, 67-73). There are two issues with this argument. First, we must assume that all the figures involved in this calculation (daily consumption, size of Greek population, production attested in *P. Köln* V 221) are correct. We have no direct evidence of the size of the Greek population in Egypt, making this calculation difficult. The greater problem in the argument, however, is in limiting the consumption of this local wine to Greeks. Using von Reden's figures, counting average daily consumption at c.0.5 hl. per day and yearly production as 220,000 hl., we find that the Fayum could only produce enough wine per year for c.440,000 people. This is clearly well below the figure of 3.5-4.5 million von Reden accepts for the population of Egypt, as estimated by Manning (2007, 441). Thus if only a small percentage of the non-Greek population regularly consumed wine, the wine produced in the Fayum would not suffice. Since the existence of wine sellers throughout the Fayum is well attested (Thompson 1999b, 134; von Reden 2011, 428), we can expect that the consumption of wine was not

[29] Customs duty rates on importation might have been high in Strabo's time, as they were in the Ptolemaic period (see TABLE 7, located in CHAPTER 4.1).

simply limited to Greeks. The evidence of the scale of wine production in the Fayum does not, therefore, necessarily demonstrate that the population could be supplied with local wine.

There are potential problems in the source material used here. We might suppose, for example, that conditions had changed significantly by the time Strabo was writing. It could also be suggested that the sparse cultivation of olive trees and vines was a result of the mismanagement of the later Ptolemies. Manning (2003, 230-231), however, argues that despite the incompetence attributed to these rulers, economic life in the *chōra* seems to have continued as before. In addition to this, we actually see continuity between the papyri of the 3rd century and Strabo on these points: the cultivation of olive trees and vines are recorded for the Fayum, an area settled and directed by Greeks (Bowman 1986, 18; Manning 2003, 109; von Reden 2011, 425-426). Manning (2003, 233) argues that that the state only experimented with new crops and economic organization in the Fayum, which, if correct, suggests we should be wary of regarding the cultivation there as indicative of Egyptian agriculture overall. Another possible change between the 3rd century and the time of Strabo is the growth in the population of Alexandria, which might have resulted in the requirement to import most of its wine. We cannot fully explore this because of the lack of evidence of the population of Alexandria in the 3rd century and its growth over time.

Stamps on amphora handles can probably do little to illuminate this picture. As Fraser (1972/1, 167-168; 1972/2, 286-287) notes, the high representation of Rhodian amphorae might not in fact represent trade from there, but could instead demonstrate the re-use of empty Rhodian amphorae by importers, or that by this time stamps on handles merely referred to the capacity of the amphorae rather than to their place of manufacture. This makes it difficult to accurately interpret this material. Additionally, Fraser (1972/1, 168) argues that empty amphorae were imported into Egypt for re-use, which would mean we cannot assume that amphorae handles always signify the importation of consumption goods.

We cannot claim to know from the papyri any detail about the use of subject territories as sources of raw materials for Egyptian manufacture (Rostovtzeff 1941, 385). As mentioned, the general nature of importation suggested by the papyri is one of consumption goods, such as wine, cheese, honey, and

olive oil. This is perhaps inconsistent with what we might expect from a mercantilist policy that favoured the importation of raw materials to be exported as finished goods (Ekelund and Hebert 1975, 31). This is not to say that this practice did not occur at all: the metal-working and perfume manufacture undertaken in Alexandria (Fraser 1972/1, 136) suggest that the importation of raw materials was the basis of some industries in Egypt. Based on the above observations on Alexandria's need to import, it seems that we can hardly assume that self-sufficiency was a goal of Ptolemaic economic policy. This is all the more significant as the state had an important role in directing agricultural production. Since imports were required, self-sufficiency was not a goal of policy or could not be achieved for practical reasons. The expense spent cutting a canal between the Nile and the Red Sea, and fitting it with a lock (Diodoros 1.33.11; Strabo 17.2.25), suggests there was a desire to facilitate the movement of goods between Egypt and the outside world, rather than preventing it.

5.1.2 CONTINUITY AND DIPLOMACY IN TRADE POLICY

The prohibitions and high tariffs on importation might suggest that we should reject revenue collection as the main aim of Ptolemaic trade policy (Andréadès 1932, 26), or that we should believe it an inefficient one, as discussed in CHAPTER 4.1. I argued above that a mercantilist or protectionist purpose of these tariffs is also doubtful. In addition to this, even if we believe that the imposition of tariffs was aimed at revenue collection, however inefficient this was, we must still explain the existence of prohibitions on importation, since these might have resulted in a foregoing of revenue. We can explore the possible adoption of pre-Ptolemaic policy to consider whether or not this policy was necessarily purposeful beyond a program of assuming the established forms of administration. In this connection, it is important to note that Strabo (17.1.6, 17.1.18, trans. H. L. Jones) saw prohibitions on importation as a particularly Egyptian custom:

> Now the earlier kings of the Egyptians, being content with what they had and not wanting foreign imports at all, and being prejudiced against all who sailed the seas, and particularly

> against the Greeks…set a guard over this region and ordered it to keep away any who should approach.

It is possible that his perception of Egyptian limitations on trade was based solely on Ptolemaic policies. It is nevertheless important that he attributes prohibition to native Egyptian kings. Beyond Naukratis and other Greek settlements of the Delta such as Thōnis (Goddio 2007, 117), archaeological evidence for Greek trade to Egypt before Alexander's conquest is extremely sparse (Milne 1939, 178; Austin 1970, 33), in contrast with the evidence from the Hellenistic period. Indeed, the amount of evidence of trade between Greece and Egypt is in general far less than that in the Greek Archaic Period of trade between Greece and other foreign regions (Austin 1970, 43). This apparent lack of imports during this period perhaps supports Strabo's claim.

From Egyptian sources, we cannot say in great detail how the state handled trade in earlier periods, and whether or not the importation of goods should be considered a state monopoly (Kemp 2006, 317-318). There are indications that the Egyptian state had been directly involved in trade, making payments for the importation of goods (Warburton 1997, 235-326). The Naukratis Stele of Nectanebo I (Erman and Wilcken 1900, 127-135; von Bomhard 2012, 95), also discovered at Thōnis (Goddio 2007, 77) attests to the existence of customs duties on trade in this period. It states (col. 9, trans. von Bomhard 2012):

> …the processed wood, and of all things coming from the sea of the Hau-Nebut, of all goods that are reckoned for the benefit of the royal domain in the town named *ḥnt* (Thōnis), as well as one tenth of the gold, of the silver.

Lloyd (1983, 329) argues that the Egyptian state collected extensive revenues through the concentration of all import and export in Naukratis and levying duties on it. This suggests that Ptolemaic policy could have been based on pre-existing tolls, or at least a realization of the same advantages of centralizing collection at one point.

The perception of limiting importation as an Egyptian practice is further suggested by Herodotos' claim (2.179), if accurate, that Naukratis (founded c. 625) had once been the only trading port in

Egypt, at least from the time of Amasis.[30] As I suggested in CHAPTER 3.1.6, it appears that Ptolemaic trade policy, rather than merely focused around barriers to trade, was an opening up of the importation of foreign goods, but only to and from cities and regions of special privilege. The establishment of this trade policy might be understood as based on the grants of special privilege held in the Late Period by Naukratis and the merchants allowed to bring goods for trade into it. In this comparison, we see the special privilege accorded to Naukratis, as we see for Alexandria in the Ptolemaic period, and also the special privileges given to the cities of exportation. Herodotos (2.178) records these as twelve, chiefly states of Asia Minor and nearby islands, as well as Aigina, and his record is supported by the archaeological evidence from Naukratis (Möller 2000, 201). Coins found at Naukratis, largely Aiginetan and Ionian examples, also point to the dominant position in trade of those states associated with Naukratis (Milne 1939, 181).

We can thus view the Saite policy as presented by Strabo and Herodotos as based on the granting of special trade rights to Naukratis, while prohibiting trade from the Mediterranean in general. The similarity with the Ptolemaic policy suggests a possible borrowing of practices. We must consider this policy in terms of its diplomatic as well as economic concerns. Diplomatic interests might have been a consideration in the granting of trade privileges to certain Greek states by the Saite kings at Naukratis (Diodoros 1.66.9), for example for recruiting mercenaries or as allies in resistance against the Persians (Austin 1970, 41; Lloyd 1983, 342-343; Möller 2000, 37). These non-economic aspects

[30] Herodotos' claim that the city of Naukratis itself was strictly the sole port at this time should be understood more broadly in light of the archaeological evidence from Herakleion-Thōnis, where Greek and Levantine amphorae have been found from the Late Period (Goddio 2007, 117). Herodotos (2. 179) states that all trading ships had to sail to the Kanopic mouth in order to enter Egypt and access Naukratis, located on the Kanopic branch of the Nile. The location of Herakleion-Thōnis there means that he was at least aware of the connection between the settlement and trade, and might have lumped Naukratis and Herakleion-Thōnis together as a designated area of foreign trade. Pfeiffer (2010, 17) argues that the evidence from Herakleion-Thōnis does not contradict Herodotos' claims, since the finds from there might pre-date Amasis' establishment of Naukratis as the sole port.

of trading rights would have become even more significant as the Ptolemaic kingdom arose as one of the leading powers of the eastern Mediterranean. Just as in the understanding of internal policy, we must not only consider the benefits that the king accrued as result of his foreign programs, but also those that fell to his chief subordinates, through whom he ruled the dominions.

We can see that the geographic distance and separation between Egypt and these subject or allied states such as Kos and Knidos meant that subjugation of these territories by force was costly and difficult, and could only be realistically achieved through mutual agreement. Diplomacy, therefore, was crucial to the maintenance of the Ptolemaic sphere of influence in the Eastern Mediterranean (Bagnall 1976, 229-230). In addition to this, the proximity of these states to the rivals of the Ptolemies, such as the Antigonid and Seleukid dynasties, meant that the burdens of Ptolemaic suzerainty had to be matched by even greater benefits. Permission to trade with Egypt can be understood as one such benefit. And, as explained in CHAPTER 4.1, the high profitability required for importation under high tariffs suggests this trade was monopolized further within the cities granted this trade privilege. Bagnall (1976, 227) argues that the farming out of trade privileges was the general practice within Ptolemaic possessions in the Mediterranean. From this we can understand the political and diplomatic aspects of these grants as all the more significant, since their benefits would fall to the politically and economically connected. As Gabrielsen (2001, 222-236) shows, the trading associations of Rhodes, the chief trading partner of Ptolemaic Egypt, were closely connected with political, social, and military affairs, and therefore the economic links between the two were most likely important diplomatic considerations.

This view of foreign trade based on special privileges, linked closely with diplomatic concerns, is suggested further by the later importance of trade between Alexandria and Italy from the 2nd century onwards (Fraser 1972/1, 155). This was accompanied by the rise of the Roman Republic to hegemony in the western Mediterranean, and soon after in Greece. It is significant that the earliest evidence of regular trade between Italy and Alexandria is dated after the Romans' expulsion of

Antiokhos IV from Egypt in 168 (Fraser 1972/1, 155-157).[31] From this time Rome became enormously significant in the diplomatic relations and legitimacy of the Ptolemaic kings (Polybios 29.27.11.; Hölbl 2001, 187), and so we can hardly view this simultaneous development in commerce as coincidental. It demonstrates on the contrary the fundamental link between diplomacy and trade in Ptolemaic policy.

Understanding foreign trade as based on special trading rights might also elucidate the purpose of the prohibitions on importation. If we can view the grant of importation to a certain state as a benefit, it follows that those states that were prohibited from exporting their goods to Egypt were denied the advantages that would come through this trade. It might therefore be the case that these prohibitions were aimed at harming the wealth and economic power of the Ptolemies' enemies such as the Antigonid and Seleukid dynasties, whose territory encroached on the Ptolemaic sphere of influence. This is all the more important due to the fact that a fundamental idea in Greek thought in every period was that the good man helps his friends and harms his enemies (Blundell 1989, 26). Apart from the practical effects of such a policy as described above, we can therefore understand that the perception of the king as such a figure had important implications for the rule of foreign territories. The place of diplomacy in maintaining hegemony over those territories has already been noted, and the understanding of trade policy proposed here demonstrates an emphasis on this distinction between friends and enemies. This emphasis is consistent with the arrangement of the Ptolemaic and other Hellenistic courts, in which the close associates of the king, marked out for special importance and upon whom benefits as well as obligations were bestowed, were considered his *philoi* (Mooren 1977, 17-61; Rowlandson 2007, 29-30; Strootman 2013, 43). We see that acts of *philanthrōpia* were generally part of Ptolemaic foreign policy, with gifts and special privileges given to overseas possessions in order to establish *philia* and *symmachia* between them and the king (Marquaille 2008,

[31] Earlier contact between Rome and Ptolemaic Egypt is attested in an embassy of 273 (Livy *Per.* 14; Dio Cassius 10.41.1) and a request for grain under Ptolemy IV (Polybios 9.11a). Roman coin issues of the 260s also appear to have copied the Ptolemaic standard (Mattingly 1960, 9-11; Huzar 1966). On relations between Rome and the Ptolemies in this period see Holleaux (1969 [1921], 60-83).

54-56). This diplomatic view of trade policy overlaps to some extent with the mercantilistic views described above, but without the claim that the protection of local industry was the major goal.

As a final point of emphasis in describing this trade policy as one based on special privileges, we can see that a privilege is only special if it is to some degree exclusive. Thus the prohibition of importation as the default stance is not only a measure aimed at harming enemies but is also a means of especially marking out the privilege and benefits of the trade grants held by the most esteemed subjects, allies, and friends of the king. These benefits were not only given to foreigners, but were conferred perhaps even more significantly upon the citizens of Alexandria. It was the Alexandrian population who appear to have had the greatest access to imported goods as a result of state policy. This must be viewed in connection with the Ptolemies' desire to build Alexandria as the centre of their power. I discuss this point further below (CHAPTER 5.5), in relation to the creation of a new elite class in Egypt.

5.2 THE AIMS OF CURRENCY CONTROL

The establishment of a single monetary system in Egypt would have facilitated accounting practices in royal banks, and this connection with effective collection and expenditure meant that it was associated with most other aspects of economic policy. The effects of state control of coinage explained in CHAPTER 4.4 also point to other benefits that the monopolization of its supply and the closed currency system brought to the state. I discussed this primarily in terms of the profit resulting from the state's ability to influence the value of coinage. This could occur particularly through a reduction of the weight of the coins, which could not be achieved so effectively without a strict control of metals and minting. Ptolemaic issues demonstrate this, with the metal content of both gold and silver coins being reduced in the early 3rd century (von Reden 2007, 40-41). With this control of the currency also came the ability to influence the values between coins different metals. This practice indeed occurred, with the price ratio between Ptolemaic gold and silver coins shifting out of line with that of the international market price for these two metals (von Reden 2007, 41). Both

Lorber (2005, 137-138) and von Reden (2007, 68-69) suggest that bronze coinage was traded for its fiduciary value rather than its metal content, which allowed the state to exchange these coins for more than this intrinsic value. Even the Egyptian *deben* came to be valued at 20 silver drachmas, rather than referring to a weight measure as in former times (von Reden 2007, 49; Manning 2010, 134).

The apparent prohibition of the use of foreign coinage in Egypt demonstrates that the state likely viewed the circulation of this coin within its realm as inimical to its own designs. If the imagery on coinage was a means of state propaganda (Hazzard 2000, 3-7; von Reden 2007, 56-57), it is possible to suggest non-economic reasons for this measure. But this cannot fully explain the establishment of a closed-currency system, since even the local coinage of allied or subject states, whose goods could otherwise be imported into Alexandria, was prohibited (Meadows 2001, 55; von Reden 2007, 43).

Von Reden (2007, 43-48) argues that the closed currency system established by the turn of the 3rd century was simply a response to the hoarding of foreign coins in accordance with Gresham's Law. Because the metal content of these coins was greater than that of Ptolemaic coins of the same denomination, the latter were spent and the former hoarded for their greater intrinsic value. This assumes that before the closed currency system was put into effect, coins traded according to their face value rather than their metal value. At the same time, the argument assumes that it was generally understood that coins with a greater metal content were actually more valuable than those of the same denomination with lesser metal content. This suggests that their market value would actually have been greater than face value and would have traded on the market as such, contrary to the assumption that they would trade equally.

To prove that Ptolemaic policy was simply a response to the effects of Gresham's Law, all the conditions for this law to take effect must be established, and/or the fact that foreign, higher value coins were removed from circulation must be shown. In examining Ptolemaic coin hoards in such an inquiry, we must establish what we would take as demonstrating this operation of Gresham's Law. At the least, this should be the presence of foreign coins in hoards, and the absence in hoards of lesser weight coins minted in the Ptolemaic realm. The numismatic evidence employed by von Reden (2007,

44-46) is not in accordance with this. The Kuft hoard (*IGCH* 1679) deposited after 305/304 and all other earlier hoards have a mix of both Egyptian and foreign coins. They do not, therefore, provide evidence for the hoarding of foreign coins and the circulation of Ptolemaic ones. Likewise, the Delta hoard (I*CGH* 1671) and *ICGH* 1675 only contain reduced weight issues from Alexandria, and contradict the idea that these coins would not be hoarded. The Phakous hoard (*IGCH* 1678) also contains these reduced weight coins. Even if these coins were not present, there would be methodological problems in arguing from an evidence of absence that they were not hoarded. On the contrary, we have proof that they were kept along with foreign coins. Thus, it cannot be argued from the numismatic evidence that a specific hoarding of more valuable coins occurred.

Even if there was a presence of foreign coins in hoards and an absence of Ptolemaic ones, this could simply be a result of the use of these coins as savings, having greater value per unit than Ptolemaic issues. The established interpretation could also explain this: that various coins were hoarded in the early period since they were all in circulation and could also be used as savings; they disappear from hoards due to the establishment of the closed currency system. Although it seems unlikely that we can characterize the establishment of the closed currency system as simply a means of preventing the hoarding of coins, there is not necessarily an important distinction between this idea and the concept of the closed currency system as a fiscal policy. To determine this, we have to consider why the state would be opposed to the hoarding of coins. We cannot explain a desire to prevent hoarding by a need to avoid the liquidity trap that is considered in economic theory the effect of a kind of 'hoarding'. This is because this modern concept refers to the hoarding of all kinds of money. Since the argument was that it was only the more valuable, foreign coins that were hoarded, hoarding would not affect the circulation of Ptolemaic issues.

Von Reden (2007, 46) seems to suggest that the state wished to prevent the hoarding of foreign coins because this hindered it from obtaining these coins through taxation and re-minting them with a lower metal content. The advantages that could come from preventing hoarding, therefore, are exactly those that would fall to the state through a general policy of currency control and monopolization. There were other related benefits: the issue of a coinage with a fiat value rather than a value determined by

the metal weight of the coin is ultimately no different from the attested issues of reduced weight, debased coinage (Jones 2014, 344). From this we might expect that its benefits for the state were understood. This could have been observed through the value of the coins exceeding the price of the metal from which they were made. Since these coins did not trade in the market according to their metal content (von Reden 2007, 41) and the state gained by this arrangement, we can suppose this was an aim of policy. From this we can see the benefits that came to the Ptolemaic state from this control over coinage even more clearly.

The reasons the state might have instituted this closed currency system as a response to Gresham's Law are the same reasons we might expect it to establish this system generally: to eliminate the effects of currency competition where the state's currency is the one with less demand. Seeing this policy as a desire for financial advantages or as a response to Gresham's Law are, then, simply two sides of the same coin. If this program was initiated as a response to hoarding, we can understand that it resulted from a realization of the benefits of control over the currency. This is illustrated when we consider that the state could have avoided the effects of Gresham's Law by minting coins having face values matching their intrinsic values. Thus, even if this policy is simply a response to the effects of Gresham's Law as von Reden argues, the particular direction it took demonstrates the goals of this program.

In CHAPTER 4.4, I considered the likely effects of the collection of taxes in coin on the popularization of its use as money. Although it appeared that its role in this would have been limited, we should consider whether or not it is likely that the imposition of taxes in this form, in particular the salt tax, can be seen as an attempt by the state to increase the use of coinage throughout Egypt, as has been suggested by von Reden (2001, 66; 2007, 251). I argued that this policy might not have been particularly effective. Questions of the practicality of this collection in coin might also make this idea doubtful, suggesting the state's collection of taxes in coin might have been an effect rather than a cause of the wider use of coinage. These taxes collected in coin aimed at raising actual revenue. If coinage was not something already in general use as money amongst the taxpayers, it hardly seems to have been a practical measure to levy a tax in an unfamiliar form. The collection of taxes would only

have been made more difficult by this, increasing the cost of its collection and compromising the extent of revenue raised. The other likelihood is that these taxes were imposed simply through the desire for tax collection in coin without a consideration of how effectively they could be collected. But since we know that the major tax reforms relating to collection in cash were introduced in the reign of Ptolemy II, well after coinage had been used by the Ptolemaic state (Muhs 2005, 9), the more likely scenario seems to me that these innovations could now be effectively introduced as a result of a wider use of coinage. Even so, the rates of the salt tax were reduced overtime and exemptions became more prevalent, suggesting it might have been an ineffective tax (Clarysse and Thompson 2006/2, 46). If monetization was indeed the goal of policy, it seems unlikely that the state would have reduced the supposed incentive for using coinage in this way.

The form of monetization which the state desired was not necessarily the use of coinage by the population at large, but rather its use in in government budgets. To this end, the state brought many areas of the economy under close control to make tax-farming contracts profitable and attractive to those who held capital. In CHAPTER 3.2, I detailed how the incentive structure of the regulations relating to this was aimed at ensuring the tax-farmer had every opportunity to gain from the auction of these contracts, allowing the continued viability of this system. The monetization of the budget was seen as possible, but only if these tax-farming contracts could be attractive enough. This required reducing the risk to the tax-farmers. This monetization did not require the use of coinage as a common medium of exchange within Egypt, but only the presence of parties that held capital and could gain through buying those contracts.

5.3 THE AIMS OF CONTROL OVER RETAILING

Another important policy, discussed in CHAPTER 3.1.5, 3.2 and CHAPTER 4.3, was the system of state licenses for the sale of goods, as shown in *P. Rev.*, cols. 47-48. It seems likely that one purpose of this system of licenses was the facilitation of tax collection, through collating clear records of retailers and their locations. Limits on the number of retailers would have made it more difficult for them to

elude state agents. The result was that products could have been directed into a centralized point of retail that could be easily supervised by the state. These goods could be assessed directly from the producers, in the stock held by the seller, and as goods were sold. The more sellers, the more difficult it would have been for the state to keep track of the required tax owed. With the retailers holding the monopoly over the sale of the produce of a particular region, this system was even more efficient. In addition, the license holders, dependent as they were on the state's recognition, had the incentive to comply with state agents to retain their licenses. We can imagine that a similar system of fines as existed in the oil monopoly was imposed on the retailer who failed to act according to state regulations. This not only allowed for more efficient tax collection, but also for an increased amount of tax per good sold through the existence of a monopoly price.

Just as with the control of currency and factors of production, we see that competition with the state was eliminated by these measures. In CHAPTER 4.2, I mentioned the possibility of economic distortions resulting from this. There was, nevertheless, a clear concern from the perspective of the state for these goods to be produced and brought to market, hence the fines and penalties for state agents attested in *P. Rev.* We can see that the benefits to the state of this production extended beyond the collection of taxes resulting from their sale. The king's subjects required these goods for their own daily consumption. From the perspective of the king, this was important for their maintenance, since they were themselves producers who supplied him with revenue, or were otherwise instrumental for the continuation of his rule, as soldiers and officials. The assurance of the production and sale of goods by these policies had further advantages in the preservation of order and the king's rule within Egypt. The emphasis, therefore, appears to have been on ensuring a certain degree of consumption required for the maintenance of the overall population. These staples had to be available to the general population so that order could be kept and for the inhabitants of Egypt to continue in their position as subjects of the state. By this, the kings also established themselves as benefactors. This emphasis on gift-giving, feasts and benefaction in general is seen particularly in the Kanopos Decree, promulgated by Ptolemy III Euergetēs.

5.4 THE ORIGINS AND DEVELOPMENT OF THE *ŌNAI*

The land tenure regime and the accompanying systems of taxation in kind were based on the pre-Ptolemaic institutions of Egypt (Heichelheim 1953; Turner 1984, 149-150; Manning 2003, 49-50). Even the kleruchies, despite the fact that they were reserved in this period for non-Egyptians, bear a similarity to the land grants that sustained the military class in the Saite period (Herodotos 2.168), and were therefore based on Pharaonic institutions (Lewis 1986, 21). The Ptolemaic kings, of course, adopted the traditional royal and religious status of the pharaoh (Hölbl 2001, 77-112), and we can see this as analogous to the assumption of these economic institutions. The adoptions of each of these traditional forms can be understood as taking on aspects of the particularly Egyptian machinery of rule. The continuity between earlier economic institutions and those relating to the administration and agricultural production are well established and are conceptualized by Turner (1984, 149-150) as Model I.

The organization of other parts of the economy was based as discussed on the sale of tax-farming contracts (Turner's Model II). Precedents can be found in the Greek world at least as early as the late 5th century (Möller 2007, 379; Migeotte 2009, 50-51), and their terminology and reliance on coin certainly demonstrate this Greek origin (Préaux 1939, 450; Manning 2010, 152-153). Despite this, some have seen continuity between these tax-farming contracts and Egyptian institutions, in particular the control of production, distribution and prices that from administrative documents such as *P. Rev.* and *P. Tebt.* III.I 703 appeared to have been part and parcel of this system. Andréadès (1934) drew this connection with earlier redistributive elements of the economy, and Rostovtzeff (1941 272-273) saw in these measures a continuation of Oriental principles of state control, which suppressed the central elements of the Greek economic system. Lloyd (1983, 325-326) notes that the traditional economic institutions of Egypt, in which the state had a strong hand in organizing the economy and redistributing its goods, continued to function to a significant extent in the Late Period. There is some credence, therefore, that the economic control of the Ptolemaic state borrowed from earlier precedents.

Préaux (1954, 312-327), against this view, emphasized that the tax-farming contracts were developed completely from Greek institutions of the early Hellenistic period. She points in particular to the letters of Antigonos to Teōs (*Syll.*[3] 344), which attest to the auctioning off of the sole right to sell grain in the city. Her argument is that since this inscription comes from Asia Minor and is dated between 306 and 302, well before any evidence for the Ptolemaic system of monopolies, the grain monopoly mentioned in it could not have been based on any Egyptian institution. The *ōnai* of Ptolemaic Egypt, however, went far beyond the auctioning of rights to import a certain good as described in the Teōs inscription. In the more complex industries, such as that of oil, they carried with them a control of the production process by state officials, including the assessment of the crop, the paying of wages, the provision of capital goods and restrictions on their use. In addition, the areas of the economy farmed out were accompanied by a high rate of taxation, typically 25%.

This is another element that differs from Greek precedents and bears a greater resemblance to Egyptian ones. A typical tax farmed out in the Greek world was at a rate of one-fiftieth, i.e. 2% (Möller 2007, 379; Migeotte 2009, 50-51). The harvest tax, which we can associated with Model I, was on average between 4 and 6 artabas per *aroura* of production, sometimes up to 8 artabas (Vandorpe 2000, 200).[32] If production was at 30 artabas per *aroura* (Vandorpe 200, 200, n 109), this is a far higher rate. To compare this rate to a well attested farmed tax, the *apomoira*, normally levied at 1/6th of production, is also much higher than those known from Greece. We can also include the regulations on trade in this picture, since regular merchant trade appears to have been part of *ōnai* system, with all other importation prohibited or subject to custom-rates far higher than those attested in Greece (see TABLE 7, in CHAPTER 4.1). We therefore see two key elements of the *ōnai* (Model II) that possibly resemble Egyptian rather than Greek institutions: the state control of production goods and the high rates of taxation. Turner (1984, 152-153) notes that other elements were taken from local customs, including the use of oaths to ensure workers continued in their employment. The status

[32] To compare to a tax on grain in kind from Classical Greece, the Athenian law of 374/3 BC imposed a lower rate of one-twelfth on its kleruchies Lemnos, Imbros, and Skyros (*Agora* I 7557 = Rhodes and Osborne 2003: 26; see Stroud 1998).

of the oil-workers (*elaiourgoi*) also appears to have been based on traditional Egyptian artisanal structures (Bingen 1978a, 182).

If for the moment we accept this line of argument, a variety of rationales behind this adoption can be imagined. Apart from an appreciation of the effectiveness of this economic structure, elements of traditional institutions might have been retained as a result of the state's reliance on local elites. Manning (2011, 296-318) has drawn attention to the need to consider the use of social networks by the state in carrying out its rule. He notes that the success of the state depended on its relationship with these local social networks (Manning 2011, 325). The continuity of economic institutions associated with them, therefore, might have been influenced by the king's requirement to rule through these local networks.

I would argue, however, that the system of tax-farming contracts went far beyond the borrowing of institutions either from Greece or from local precedents. Instead, these two elements fundamentally relied on the other to the extent that, despite their origins, we should see them as part of the one system in relation to revenue collection. The central goal of the tax-farming contracts was the steady collection of revenue in coin (Manning 2003, 144; 2010, 155-157; von Reden 2007, 107). This required the state to make these contracts profitable in order to attract buyers. For this, the perceived risk of these contracts had to be minimized and their reward maximized as much as possible. Monopolies were therefore established to ensure these contracts were profitable, and a series of regulations were developed over time to establish confidence in their operation, as discussed in CHAPTER 3.2. Operations of directing and collecting economic resources were already well developed in Egyptian administrative practices, which allowed the state to make extensive use of these tax-farming contracts. The nome administration was mobilized to deal with difficulties in ensuring the profitability of *ōnai*, which were required for steady government revenues. Similarly, the *telōnai* were necessary for the transfer of taxes in kind into a monetary form, which could not have been brought about through the use of the administration alone. The high rates of taxation typical of the *ōnai* were intended, therefore, to make these contracts lucrative. The economic organization

allowing this taxation, however, was brought about by the already developed local administrative practices.

Model II, therefore, relied heavily on the nome administration, the Egyptian system of governance adopted by the Ptolemies. Without it, control of economic resources required for the reliable guarantee of profit to contractors could not have been achieved. As discussed in CHAPTER 3.2, the combination of the agents of the nome administration with the *telōnai* allowed for an incentive structure that made this system of economic organization viable. We cannot imagine the application of a similar system of tax-farming in Ptolemaic Egypt without heavy involvement from the nome administration as a means of controlling economic resources. The same case applies to the benefits of the *telōnai*: although the state in their absence could have employed the administration to organize production in the form we see in *P. Rev.* (see CHAPTER 3.2), there would have been a very limited capacity for this production to transfer into monetized government budgets. Thus, there was a fundamental interplay between these two strands, each requiring the other for the ultimate goal of steady revenue collection in coin.

The collection of revenue in itself cannot explain the control of production existing in the *ōnai*. The state could and did establish control over the sale of the produce of the fields and the final sale of finished goods to consumers. Taxation, therefore, could have been focused at points of those exchanges, which would not require the expense organizing production. This household organization likely had information problems, tending towards inefficient outcomes under state direction, as outlined in CHAPTER 4.2. One advantage of this control of resources, however, was that it demonstrated a clear advantage to prospective tax-farmers and reduced the risk in the profitability of tax-farming contracts. Although taxation could have been taken at points of exchange as just noted, it was revenue in coin that the state appears to have preferred. For this it was required to provide benefits for the moneyed tax-farmers, especially since they often had to be attracted from abroad (Manning 2010, 155).

The personal interests of the *telōnai* also played a role, since they stood to benefit from efficient uses of economic resources. In *P. Rev.*, col. 46, we see that the *telōnai* were required to attend to the production undertaken in the workshops personally, supervising the oil-workers. The *telōnai*, therefore, had the right, the duty, and the personal incentive to make efficient uses of economic resources, whether directly or through liaising with officials of the administration. Thus the local nature of the organization of production was not only based on the nome, but included information from the much lower level of the workshop. The capital goods required for production were owned and controlled by the state, and the *telōnai* could not directly arrange their organization. But since this control of capital goods, as I argued, was intended to make tax-farming contracts advantageous to their holders, we can imagine the *telōnai* to have had some influence in the distribution of production goods. The tax-farming system was set up for the mutual benefit of the *telōnai* and the state, and we can expect each to have accommodated the other to ensure continued rewards. The *oikonomoi* safeguarded the state's interests, but we should expect the state to have desired them to work together with the *telōnai* (Manning 2010, 157), rather than merely functioning as a check on them. I noted in CHAPTER 4.2 that the household control of factors of production would have been relatively inefficient, to the extent their direction was brought under the one scheme. This confirmed the necessity of local, rather than central, planning. The *telōnai* were likely essential in streamlining this organization, providing information on the most pressing needs for these productive factors.

It seems, then, that the state responded to the difficulties in the organization of factors of production by turning agents who were originally tax-farmers into local managers of industrial production. The *ad hoc* nature of the regulations relating to this, as noted by Bingen (1978a, 180-181) and Samuel (1993, 175), is suggestive of the continued revision of the administration as it responded to difficulties. In order to lessen the inefficiencies of its general control of these industrial capital goods, the state not only required specific managers of this production but to link this management with incentives for efficient output. The logical decision was to give the management role to those who gained from the sale of the final good. In this, we see that the state must have intended the development of mutually beneficial arrangements with the *telōnai* for their continued custom. This required both give and take.

This echoes the points made by Manning (2010, 59-64) on the state's need to accommodate local institutions, as against a conception of a purely predatory state. As detailed in CHAPTER 3.2, these mutually beneficial arrangements extended throughout the administration and to the level of the tax-payer. Abuses certainly occurred, but we should at least recognize the existence of actions that mitigated against them.

5.5 THE DEVELOPMENT OF A FOREIGN ELITE

Another aspect of economic programs used for political ends is seen in those areas of policy fostering the creation and advancement of a Greek elite in Egypt, at the expense of the established native elite. The establishment of an elite Greek class or superstructure has long been recognized (Rostovtzeff 1941, 265, 330-331; Lloyd 1982, 36; Turner 1984, 155-156; Lewis 1986, 31). As I noted in CHAPTER 2.1.2, the administration was Hellenized, with its high officials drawn from Greeks. Despite this, it has also been understood that the state did not employ an ethnic or racial policy (Préaux 1936b; Goudriaan 1988, 116-119; Manning 2010, 88). Indeed, native Egyptians continued to achieve status positions in the administration and through temple offices (see CHAPTER 2.1.5). In addition, even where native Egyptians lacked certain privileges, it is not always clear whether we should regard this advantaged element in society as merely Greek.

As I note below, other foreigners received the same or similar privileges as Greeks, and Goudriaan (1988, 91), strengthening an idea of Bickermann (1927), argues that the term *Hellēnes* did not refer specifically to Greeks, but to all foreigners, or a specific class of them. So if we are to apply any ethnic consideration to these policies, the designation should be between Egyptian and foreigner rather than Greek and non-Greek. Here I explore the ways in which economic policy helped to form this new elite class, considering the origins and rationale for this development. We can see four aspects of policy in this: tax privileges, land grants, tax-farming contracts, and the establishment of Alexandria as an economic centre. These measures can be seen as shifting the balance of wealth in favour of foreign elements.

Special tax privileges were granted to a class of *Hellēnes*, including exemption from the obol tax. As Clarysse and Thompson (2006/2, 155) note, this special status was accorded for the most part to foreigners. This not only included Greeks, who held the most privileged position, but also Persians, Arabs, and Jews (Clarysse and Thompson 2006/2, 154-161). This demonstrates that these privileges were not ethnically restricted, and perhaps shows the state upholding advantages held by these groups before Ptolemaic rule. The continued settlement of Jewish mercenaries at Elephantinē under Persian rule (Porten 1968, 8-16; Lloyd 1983, 317) indicates that they had a distinctive status and links with the regime. We can also point to the exemption on the payment of the salt-tax granted to instructors in Greek culture (*P Halensis*, 260-265).

The beneficiaries of the new tax-farming institutions, relying on coin as capital, were mostly foreigners and Greeks in particular (von Reden 2007, 107). As I have argued above (CHAPTER 5.4), most of the economy was organized towards ensuring these tax-farming contracts represented a good profit to the tax-farmer. This meant that through employing coin as capital, moneyed parties drew much of the surplus production of Egypt into their own hands. This must have been a significant development, shifting some of the surplus wealth away from the established elements of the population, and probably from the native elite: as part of this, temple production was curtailed and brought under the supervision of the *telōnai*.

The advantages that came to the Greeks is also apparent in the nature of state banking institutions. Here we again see a Greek predominance in this sphere (von Reden 2007, 294). These new monetary institutions created opportunities for Greeks that were not open to Egyptians to the same extent, especially as they were governed by personal connections with the administration (von Reden 2007, 294). The introduction of these policies based on the use of the money resulted in the dependence of the Egyptian population on the Greeks who controlled these related institutions (Bingen 1978b, 228). As Clarysse and Thompson (2006/2, 225) note, the parties having access to cash were those most able to gain economic advantages in the newly monetized elements of the economy. The argument I make above, that the administration was directed towards making these contracts lucrative, bolsters this idea further and suggests the results of this development were even more significant.

Another privilege held by foreigners is seen in the establishment of kleruchies, discussed in CHAPTER 3.1.1. It is generally recognized that these were restricted to non-Egyptians in this period (Crawford 1971, 55; van 't-Dack 1988, 7; Fischer-Bovet 2014, 175). In addition to Greeks, Thracians, Jews, and Anatolians were granted kleruchies (Bagnall 1984, 10-16), and Polybios (5.65.10) attests the settlement of Gauls in Egypt. This all confirms that kleruchies were reserved for foreigners. Even later, when native Egyptians received military land-grants, they were typically smaller than those of Greeks (Lewis 1986, 31). These land-grants commonly resulted in their lease to other parties, with the kleruchs living off this rent (Lewis 1986, 20). Kleruchs also received further privileges, such as the payment of the *apomoira* at 1/10 of produce rather than at the usual rate of 1/6 (Clarysse and Vandorpe 1998, 23-26; von Reden 2007, 96-97). These kleruchs, therefore, were not merely settlers, but should be seen as part of a ruling class, whose obligations were to support the central state, receiving privileges in return.

As the military represented the most basic and ultimate means of rule, the allegiance of its members was an important consideration. In the Saite period, the officers of the Egyptian military were firmly part of the elite. Apart from the priests, the military was the only class which received special privileges from the state. Soldiers were given grants of land, and the king's bodyguard also received luxuries for their daily consumption (Herodotos 2.168; Fischer-Bovet 2014, 38). In addition to this, priests regularly served as army officers both before the Persian conquest and from the 2nd century onwards (Fischer-Bovet 2014, 303), and so we can understand that in Egypt the military was clearly linked with other elite positions in Egyptian society. There was, therefore, continuity with the Late Period in the settlement of mercenaries, particularly foreign ones (Lloyd 1983, 316-317). We can expect that this occurred not simply as a borrowing, but as a response to the same challenges of rule. The power of local elites could be checked by generally barring them from military positions, and we see in this settlement of kleruchs political as well as economic goals.

The establishment of Alexandria as the capital, and the wealth and privileges bestowed upon it was also part of this process. Economic advantages came to the city as a result of the establishment of the king's court and a concentration of patronage there. Apart from the natural advantages of the site as

noted by Strabo (17.1.7), the importation of goods allowed to Alexandria gave the city advantages of the state's making. This established it as the most important centre of trade, through which much of the wealth of Egypt was directed (Fraser 1972/1, 132-133). The city was dominated by Greeks (Fraser 1972/1, 133; Thompson 2009, 400; Manning 2010, 139) and therefore we see in this development the transfer of this wealth into Greek hands.

We can also understand the very establishment of Alexandria as the capital, supplanting Memphis, as an important political and economic shift, influencing the creation of this new foreign class.[33] By this move, the Ptolemaic court and the wealth and influence associated with it were shifted into a Greek context, and away from the traditional elites of the country. The symbolic significance of this move is seen in the requirement of priests to make an annual journey to Alexandria to pay homage to the king, as mentioned in the Memphis Decree of 196 (*OGIS* 90, 17).[34] A perception of a shift in power from Memphis to Alexandria is attested in the Oracle of the Potter (Austin 2006: 326, 29-40). Originally composed by the late 2nd century and likely of a priestly origin (Lloyd 1982, 54), it contrasts Alexandria and Memphis, linking the former to what its author sees as the lawlessness and corruption of the Ptolemaic regime.

In certain cases, economic advantages were also taken away from local elites. Functions of the temple were shifted to the new system of tax-farming represented by the *telōnai*, as mentioned. This not only included the collection of the *apomoira* tax, but also moved the control of capital goods and production out of the temples (*P. Rev.*, cols. 49, 50-51). Even the small amount allowed to them for the production of oil was strictly supervised by state agents. There is some continuity here with the Persian period, for which there is evidence of the confiscation of temple incomes by the state (Lloyd 1983, 302-303). This aspect of policy, however, was a limited one. Egyptian institutions, particularly in the machinery of administration and the operations of the temples, continued throughout the Ptolemaic period (Manning 2010, 97-102). As noted, temples received their own special privileges,

[33] Memphis remained the religious centre of Egypt (Thompson 1988, 75; Hölbl 2001, 89).

[34] This requirement is remitted in the decree, demonstrating its existence before the decree's promulgation.

including the payment of a lower rate on the *apomoira* and a fixed land tax instead of the harvest tax (the harvest tax appears to have been imposed on temples only from the end of the reign of Ptolemy III, see Vandorpe 2006, 168-169). This native elite provided important functions for the central state in its collection of revenue, overseeing of production, and maintenance of order throughout Egypt (Manning 2010, 83). In comparing the temples with the economic advantages provided to foreigners, we do not see an attempt to promote a particular ethnic group or to eliminate the power of the local elites completely, but rather to re-balance the institutional structure of the realm in the king's favour, in line with the appropriate concept of 'divide and rule'. These developments were not necessarily planned with only the interests of the central state in mind. Because of the economic benefits of these policies to those connected with the regime, for example the *dōreai* granted to high officials and the profits of the tax-farmers, there was likely an element of rent-seeking in this. Parties who had influence with either the central or local government were likely able to increase their standing through the establishment of further economic privileges.

CHAPTER 6: CONCLUSION

6.1 THE PRINCIPLES OF PTOLEMAIC ECONOMIC POLICY

The influence of the state in the control and management of resources was the basic principle of economic policy. As I noted in the introduction, the early view that the economy was planned centrally has been modified as a result of the realization of the local nature of this organization (Vidal-Naquet 1967; Bingen 1978a). I added to this recognition of local economic planning by detailing and supplementing our understanding of the operation of the *ōnai* (CHAPTER 3.2), and explaining with the use of economic theory the greater economic efficiency that resulted from a local management. (CHAPTER 4.2). Despite this, state control of resources is clear, and the hierarchical nature of the Egyptian state and administration suggests that this organization must have been supported by high officials and the king for their own benefit. The recognition of local planning requires a clarification of the role of the central state. We can resolve the discrepancy by distinguishing the functions of each of the central state, the nome administration, and the *telōnai*. The dictates of the central state, detailed most fully in *P. Rev.*, were aimed at ensuring that the local administration took control of economic resources, accounted for them accurately and prevented unauthorized parties from accessing them. From there, the local administration, rather than the central administration, directed the use of these resources. The *telōnai*, in addition to their important role supplying taxation in coin, contributed to this local planning, having the incentive to act as a check on the *oikonomoi* and other state officials.

The office of the *dioikētēs*, therefore, was responsible for setting up and maintaining this system, and as part of this was required to bring the economic resources of the country under state control; this, however, does not mean that the use of these resources were decided by the central state, nor is this suggested by the evidence (Vidal-Naquet 1967; Bingen 1978a). The structure of the operation of tax-farming contracts, discussed in CHAPTER 3.2, demonstrates that the central state aimed to enforce its regulations through the self-interest of local agents, rather than requiring constant intervention from

higher officials. This devolution of an element of enforcement to the local level is consistent with the local nature of economic planning, and we can expect that, just as for economic planning, this was a practical necessity in order to enforce regulations relatively efficiently. *P. Rev.* therefore attests a form of household organization of resources, but one that was decentralized at the level of its administration and allowed for feedback from interested parties in the guise of the *telōnai*.

As I pointed out in CHAPTER 5.4, state control over the economy is consistent between both Model I and Model II, as conceptualized by Turner (1984, 150-154). This suggests that these two areas of economic policy, though quite different in their details, were governed by the same principle in their development. In addition to this, since we can understand Model I as closely descended from the long established Egyptian form of administration, with Model II originating from Greek methods of revenue collection, we can see that the establishment of Model II was not merely a grafting of a foreign institution onto the Egyptian administration as Préaux (1939, 450) proposed. Instead, it was adapted to the local setting according to Egyptian principles of governance (Model I). This partly explains the extension of the functions of the *telōnai* well beyond the farming of taxes, which represents a consistency in function between Model I and the early forms of tax-farming that were to develop into Model II.

This augments the established view of Rostovtzeff (1941, 273) and Préaux (1954), who saw this system of contracts as purely Greek. The origin of the form of these *ōnai* was certainly based on Greek institutions, but their function was adapted to the Egyptian administration. The operations of these so-called monopolies mirrored the traditional state's overseeing of agricultural production, but in this instance was concerned with industrial production. This organization of industries was not an entirely new creation: we saw in CHAPTER 3.2 the implication that this control over production goods in industrial production was at least partly taken over from that of the temples. This further suggests the adaptation of established Egyptian economic institutions into this system of contracts. The control over both production goods and the final product seen in the state's influence over agricultural production is clearly evident in the organization of industrial production under the *telōnai*.

The organization of these industries required delegating its management to certain officials. As we saw, the tasks relating to the administration and supervision of the economic production for which these contracts were auctioned off by the state were divided between the *oikonomoi* and the *telōnai*. This bears some similarity to the division in the supervision of agricultural production between the offices of the nomarch, the *basilikos grammateus*, and the *oikonomos*. In both Model I and Model II, the *oikonomos* was the co-ordinating figure, whose duty was to ensure that these activities were being adequately carried out and to collect taxes on the resulting production.

In this, we must understand that, just as the king helped to reinforce his elevated status through his position as benefactor, the local influence of the nome officials was affected by the significance of their duties. The control of economic resources by state officials, therefore, was not only beneficial to those who formed policy on the king's behalf, but also added to the status of these officials, who in local terms were the proxy of the king as benefactor. This conception of control as the consistent and governing principle of economic policy does not, therefore, require a simple despotic model of the state that ignores the importance of the local nome administration. On the contrary, it helps to elucidate how the continuity of local Egyptian forms influenced the policy of the central state.

I also noted throughout CHAPTER 5 that we should not only consider the economic aims of state actions relating to the economy, but also those that aided the state in keeping order in its realm and prevented the concentration of wealth in the hands of non-state parties. This can be seen to have two elements: first by increasing the power and influence of the state to place it in the position of benefactor, controlling the use of economic resources. Through this means the state could favour or penalize particular institutions in order to promote or suppress individuals and groups it saw respectively as useful or inimical to its designs.

While connected with the revenue goals of economic policy, the emphasis I place on its political aims demonstrate that this policy was one arm of the state's machinery of rule, which also included religious, military, and legal institutions. This supplements the understanding of revenue collection as the focus of this policy (Préaux 1939, 431-432; Manning 2010, 1), and qualifies the idea that it was

aimed at increasing or mobilizing production (Préaux 1933, 548; Rostovtzeff 1941, 271-272; Turner 1984, 135). Revenue collection, based as it was on tax-farming, required the state to be able to control the taxed production to ensure an income to *telōnai*, allowing for a continued demand for tax-farming contracts. The latter were necessary in order for the state to receive, in some cases, a monetary income on taxation in kind. This transfer of taxation in kind into coin was less important in relation to grain, since it was commonly used for payments, in particular for wages; hence the preservation of Model I alongside the development of Model II. It appears, therefore, that the central state aimed at the control of resources in order to place them into the hands of tax-farmers, providing monetary revenue, rather than an increase in production or a mobilization of resources *per se*. The consistencies within each of these models and between these models suggest that we can conceptualise a distinct 'Ptolemaic economic policy', while recognizing its Egyptian and Greek precedents.

6.2 PTOLEMAIC TRADE POLICY

One area focused on particularly was external trade. I supplemented our understanding of trade policy, attempting to make this consistent across the few documents relating to this and between economic policy overall. The established view placed emphasis on the high rates of customs duties levied on importation (Andréadès 1932, 19; Rostovtzeff 1932, 748, 768; 1941, 385; Préaux 1947, 58; 1954, 322; Fraser 1972/1, 150; Sidebotham 1986, 9-11). Scholars generally argued that these duties limited trade due to their high rates. The logical conclusion of this understanding was that the state set these tariffs at high rates to limit importation and to encourage local production. In CHAPTER 3.1.6, CHAPTER 4.1, and CHAPTER 5.1, I re-considered the nature, the effects, and the purpose of these customs duties respectively, comparing them with other aspects of economic policy that might shed further light on their nature. Comparison with *PCZ* 59015-R and the regulations relating to the importation of vegetable oil in *P. Rev.* supplemented the evidence of customs duties recorded in *PCZ 59012* and suggested that customs duties were not the only feature of this policy. *PCZ* 59015-R

attested a system of contracting for large quantities of oil, in contrast with the smaller amounts of goods recorded in *PCZ 59012*. This would not only be in line with the general system of Ptolemaic contracting, but the very nature of such monopolies would require the state to limit competing importation. This might be represented in the high customs duties. A precedent for allowing competition with state contractors, but at a significant cost, is attested in *P. Rev.* col. 52. This refers to an allowance of vegetable oil for personal use, with a charge levied at 25%, one of the rates at which duties were set on goods in *PCZ 59012*.

As explained in CHAPTER 4.1, this has important implications for assessing this policy's effects. The protective or compensatory effects of the tariffs, so emphasized by Rostovtzeff (1941, 385) and Fraser (1972/1, 150), is based on an understanding of these duties as applied to all importation, necessarily limiting it. Having considered this, I showed that doubt remains whether or not we can indeed attribute such effects to these policies. The evidence demonstrates that such importation could and did take place despite the historically high tariffs, allowing for the collection of significant revenue per item. The possibility that *PCZ* 59015-R attests to state contracts could help to make sense of importation under such high tariffs: the state payment to importers could have compensated them for these extensive dues. In addition to explaining this importation through state contracting, I noted that locally-produced goods could not necessarily act as substitutes for foreign goods in the market.

The prevalence of goods from regions associated politically and diplomatically with the Ptolemaic state suggests an organization of importation based on granting trade privileges. In this we see again that economic and political aims were linked. The diplomatic aspect of this policy is mirrored in the closed currency system, preventing the circulation of foreign coins in the Ptolemaic realm. As importation from the Mediterranean seems to have been limited to the ports of Alexandria and Pelusion, there was continuity with the status of Naukratis in the Saite period, which was likely based on economic, diplomatic and political considerations. This would further suggest that this trade policy was not only based on calculated economic goals, but also might have developed out of established precedents, both those relating to trade specifically as well as those adopted generally throughout the economy. This policy, however, was not necessarily an adoption of earlier policy:

both the Saite and Ptolemaic kings were based in the same geographic area, and each was bordered by a large empire holding territory in Syria, Mesopotamia, and Asia Minor. Each made a similar use of the geography for channelling importation, and sought similar allies against the Neo-Babylonian/Persian and Seleucid Empires respectively. For the Ptolemaic kings, the political aspects of this trade policy went even further, since they wished to strengthen Alexandria as a new power base, and its status as a port of trade was a means towards this.

External trade appears to have been organized on the same basis as much of the rest of the economy, conforming to Turner's (1984, 152-154) Model II. Even the particular rates of the customs duties appear to have been borrowed from this model. We should also expect that the collection of these duties was auctioned off to tax-farmers, as was the practice in Roman Egypt (Pliny *NH*, 6.84). As in other areas of the economy, selling the right to collect customs duties would also have facilitated their enforcement, since the contractor had an incentive to ensure items were properly valued and that dues were paid in full. The consistency in policy implies that we cannot necessarily attribute particular, discrete aims to it as one focused on goals specific to trade, but rather that it should be understood as one aspect of the overarching structure of Ptolemaic economic policy. My inquiry into trade policy on these lines demonstrates that we should be wary of assuming that the purposes of each aspect of policy were developed with a consideration of cause and effect relating to that specific policy, rather than being shaped around general administrative practices. This does not, of course, mean that those general principles were not themselves based on an understanding of the effects of policies reliant upon them.

In this way, high customs duties would have been a means of facilitating revenue collection through three streams: contracts for importation, contracts for the collection of dues where demand offset their costs, and contracts for local production where their costs prevented foreign competition. In the last case, tax-farming contracts were made more secure, but the other cases show that the state was not prepared to sacrifice tariff and trade revenue in order to prevent foreign competition fully. The relationship between trade policy and local contracting, therefore, demonstrates the state hedging its revenue sources, rather than simply favouring the latter at the expense of the former, as is the

established view. This is consistent with the emphasis on avoiding risk and ensuring steady revenue which has been noted as a purpose of tax-farming contracts in general (Préaux 1939, 431-432; Manning 2010, 155).

6.3 INSTITUTIONAL CHANGES AND THEIR LONG-TERM EFFECTS

Turner (1984, 158-160) argued that Ptolemy II's economic policy led to the exhaustion of state finances and oppressive exploitation, resulting in later disaster for the dynasty. The evidence Turner draws on is sparse, based on conditions of the new settlement in the Fayum, and does not allow for clear proof for this assertion. Even so, we can explore the long-term effects of this policy further by considering the institutional changes it brought about. In CHAPTER 5.5, I discussed how economic policy was a major influence in the creation of a new elite class. This development had much to do with economic incentives and access to resources afforded to these parties in line with state policy. The result was an increase in the influence of Greeks in the administration and especially of the city of Alexandria, and accordingly a relative diminution of that of the temples. To illustrate the significance of these developments, we can also consider their effects in the period that followed.

In the reign of Ptolemy IV Philopatōr, the state began to face major problems of rule from internal pressures. First, Philopatōr, according to Polybios (5.35.6-7, 5.63.1, 15.2.1), allowed his ministers Sōsibios and Agathoklēs to attain control of the state, and to arrange its affairs according to their own will. As I noted in CHAPTER 2.1.1, the extent of their power and how it differed from those of the chief ministers of Ptolemy II and Ptolemy III is uncertain, but the implication of both Polybios, and later Strabo (17.1.11), is that this was a major break in the government of the kingdom. Sōsibios and Agathoklēs were drawn from the Greek elite that had been empowered most significantly by Ptolemy II.

Since this economic policy affected the influence of the temples, there was possibly some connection between it and the revolt of local elites in Upper Egypt at the end of the reign of Ptolemy IV (on this revolt see in particular Veïsse 2004, . Vandorpe (2006, 168) argues that around 223, not long before

the death of Ptolemy III, harvest taxes on private land in the Thebaid began to be paid directly to the state, rather than to the temples. Their maintenance from that time onwards was instead supplemented more greatly through *syntaxeis*, allowing the state to determine the distribution of these taxes. In this, we see the continuation of the economic policy of Ptolemy II, which brought certain economic privileges held by the temples under state control. As Vandorpe (2006, 168) suggests, this might have been a further point of tension between the state and the native elites, and provided an impetus for their revolt. In addition to this, the Memphis Decree promulgated under Ptolemy V in 196 attests the remission for the temples of the *artaba* tax on land, which might have been introduced as early as the reign of Ptolemy II (Vandorpe 2006, 166). The abolition of this tax as well as other priestly duties at this time suggests that the state might have overextended its demands on some of the temples and had to restore its relationship with certain disaffected parties. Despite this, the state ultimately succeeded with its policy in Upper Egypt: after the restoration of Ptolemaic rule in the Thebaid, ownerless land was auctioned off and the state was able to establish direct collection of the harvest tax (Vandorpe 2006, 168).

The Theban revolt was preceded by other significant developments relating to the activities of the Egyptian population: the creation of a native military force for the main phalanx of the army, accompanied by the well-attested extension of military settlement to native Egyptians throughout the 2nd century. Polybios (5.107.1-3) tells us that this Egyptian force soon refused to obey the state, and implies that it was responsible for the revolts that followed (though see Peremens 1975, 395-402). This shift in recruiting might suggest that either the practice of favouring the use of non-Egyptians in the army was inadequate for the military requirements of the kingdom, or that the state was required to re-align the institutional structure in Egypt once again. This important shift in the organization of the Ptolemaic army occurred under the premiership of Sōsibios and Agathoklēs, and Sōsibios himself commanded this native phalanx in battle (Polybios 5.65.9). This development, therefore, might have had much to do with internal politics, especially when we consider the opposition to these two ministers from Graeco-Macedonian mercenaries and generals, including Theodotos, the governor of

Koilē-Syria (Polybios 5.40.1.) and Kleomenēs of Sparta (Polybios 5.38-39); they were ultimately ousted by the army of Tlēpolemos, stationed at Pelusion.

The political nature of military appointment in Ptolemaic Egypt is seen in Agathoklēs' re-organization of the army at the death of Ptolemy IV, which was designed to promote those who would be loyal to him:

> [Agathoklēs wished to] send away the existing force of mercenaries to the country forts in Egypt and to the foreign settlements, and then with these new arrivals to fill up and remodel the household troops and the guards of the court, and of the rest of the city, thinking that the men he himself had enlisted and whom he paid, as they had no political sympathies regarding past events of which they were ignorant, as they reposed their hopes of preservation and advancement on himself, would readily support him and join heartily in executing all his behests (Polybios 15.25.17, trans. W. R. Paton).

The arming of a part of the Egyptian population by Sōsibios in the prior decade, accompanied by hiring new contingents of foreign mercenaries, might, therefore, have been undertaken for similar reasons. This army was required to repel the invasion of Koilē-Syria by Antiokhos III and that its make-up was likely influenced by the need to raise an army quickly under this pressure. This makes the composition of the army for the campaign of Raphia all the more significant: the newly-raised elements, Egyptian, Libyan and mercenary, certainly outnumbered the elements of the army that were likely composed of the Graeco-Macedonian military settlers (Polybios 5.65.1-10). The standing army, therefore, had either significantly decayed, as suggested by Polybios (5.62.7-8), or these ministers refused to allow it the chief position in the campaign. Both possibilities suggest a reluctance to strengthen the position of the Graeco-Macedonian element that had previously been dominant in the army.

Another later development stemming from the institutional changes of the 3rd century was the political importance of Alexandrians. From the mid-2nd century onwards, its inhabitants emerged as kingmakers, whom the Ptolemies had to appease in order to secure and continue their rule. The

incidents that demonstrate the development of the Alexandrian population as a political force is presented in TABLE 8.

TABLE 8. Timeline of Alexandrian influence in politics.

Year	Events
202	Alexandrian mob murder the regent Agathoklēs.
169	Alexandrians place Ptolemy VIII as co-ruler of Ptolemy VI.
163	Alexandrians restore Ptolemy VI after he had been expelled by his brother Ptolemy VIII.
131	Alexandrians drive Ptolemy VIII from Egypt; his son Ptolemy Memphites is killed by Ptolemy VIII. Alexandria supports Kleopatra II against Ptolemy VIII in the ensuing civil war.
116	Alexandrians force Kleopatra II to choose Ptolemy IX as her co-ruler rather than the future Ptolemy X.
107	Kleopatra III and Alexandrians expel Ptolemy IX.
88	Alexandrians expel Ptolemy X after he melts down Alexander's sarcophagus for its gold.
80	Alexandrians kill Ptolemy XI after he murders his wife Berenikē III.
58	Alexandrians expel Ptolemy XII (restored by Aulus Gabinius in 55).
48	Alexandria supports Ptolemy XIII in civil war against Kleopatra VII.

The growth of the wealth and population of Alexandria, which was a major factor in its political rise, resulted in part from the economic policy that favoured the city. Employing this means, the state across this period centralized significant power within Alexandria, which gave the Alexandrian populace or its elites the opportunity to make use of it through their influence over the monarchy.

The re-alignment of institutions that occurred in the early Ptolemaic period, resulting in part from economic policy, therefore had repercussions for the continued bargaining over power between these institutions. Revolts by native elites, including the Theban revolt and secession under Hugronaphor and Ankhmachis, the rebellion of Dionysios under Ptolemy VI (Diodoros 31.15a) and other rural uprisings (Manning 2003, 164-171), demonstrate that the Egyptian element was not simply passive in this change (Veïsse 2004, 83-112).

6.4 A RENT-SEEKING SOCIETY OR A MORAL ECONOMY?

Rowlandson (2003, 148-152) noted that scholars have seen the peasantry in Graeco-Roman Egypt as downtrodden, economically oppressed and subject to the whims of the state and its officials, and called for further investigations into the status of the Egyptian peasant. Exhortations to officials to act justly have been seen as representing the ideal more than the reality, in which the population at large suffered extortion and violence from officials (Préaux 1939, 557-569; Crawford 1978, 199). A question related to Rowlandson's concern is whether we can see Ptolemaic economic policy as signifying a rent-seeking society, or if it might present some elements of a moral economy. Ekelund and Tollison (1981; 1997) use the former concept in reference to the mercantilist policy of Early Modern Europe. They argue that this policy was characterized by the granting of monopolies and patents to contracted companies, providing incentives for these companies to focus resources on capturing these special privileges rather than on increasing economic output (Ekelund and Tollison 1981, 18-25). The concept of a moral economy, on the other hand, refers to an embedded economic system in which a market is not the fundamental mechanism for determining the production and allocation of goods (Booth 1994, 653-656). It focuses instead on the provision of what have been considered social goods (Arnold 2001, 90-92), aimed at furnishing a livelihood for each member of society.

In general I have looked to the interests of the king and his officials as the basis of policy, favouring a view of this policy as tending towards rent-seeking. We can also see clear parallels to the monopolies of mercantilist Europe in the *ōnai* of Ptolemaic Egypt, and the importance of these contracts for state revenues meant that the economy was structured for the advantage of tax-farmers. But it is possible that this is only one aspect of Ptolemaic political economy. Westermann (1938) long ago argued that Ptolemaic rule should not be viewed as particularly oppressive, maintaining that the state closely considered the welfare of its subjects in its programs. Préaux (1939, 455) noted that we see the shortcomings of the administration more than its advantages. Reekmans (1994, 119-140), on the other hand, has pointed to the difficulties that wage earners had in securing their salaries and in procuring items of daily consumption. His suggestion is that we can attribute this in the main to the abuse of power and corruption (Reekmans 1994, 140).

While the Ptolemaic economy was not purely embedded in the sense of lacking a market, there is the potential to apply this concept of moral economy more broadly, seeing this model on a continuum rather than as a dichotomy (Warburton 1997, 103). Redistributive elements are generally ascribed to the traditional Egyptian economy (Janssen 1975a, 139; Kemp 2006, 304-308; Zingarelli 2010, 23-27), even for as late as the Saite period (Möller 2000, 26-32). Under the Ptolemies, this redistributive aspect existed within traditional economic institutions (Model I) and in the *ōnai (*Model II), which integrated elements of Egyptian economic institutions into a Greek system of tax-farming. Here the state, for example, provided a livelihood for workers, regulated production, and enforced set prices for the sale of consumption goods. As noted, the prices for different qualities of oil were level and therefore did not correspond to the price that the market would have set.

I considered the benefits that might come to the state from this system, but we can also consider those that might have fostered the livelihoods of its subjects in greater detail, a goal that I argued was linked with the state's machinery of rule. This would provide an even fuller understanding of Ptolemaic economic policy by seeing its further dimensions, and help to answer whether or not its control of economic resources, like the letter of safe conduct to which Westermann (1938, 278) was referring, 'is to be regarded as an expression of benevolent paternalism guided by common sense rather than as a measure of oppressive absolutism.'

BIBLIOGRAPHY

I. EDITIONS OF ANCIENT AUTHORS:

Agatharkhidēs of Knidos, *On the Erythraean Sea*, trans. S. M. Burstein. London, The Hakluyt Society, 1989.

Athēnaios, *The Deipnosophists*, vol. 1, trans. C. B. Gulick. Loeb Classical Library 204. London, William Heinemann, 1951 [1927].

Dio Cassius, *Roman History*, vol. 1, trans. E. Cary. Loeb Classical Library 032. London, William Heinemann, 1954 [1914].

Diodoros, vol. 1, trans. C. H. Oldfather. Loeb Classical Library 279. Cambridge, MA, Harvard University Press, 2004 [1933].

Herodotos, vol. 1, trans. A.D. Godley. Loeb Classical Library 117. Cambridge, MA, Harvard University Press, 2004 [1920].

Kallimachos, *Aetia, Iambi, Hecale, and other fragments*, trans. C. A. Trypanis. Loeb Classical Library 421. Cambridge, MA, Harvard University Press, 2004 [1958].

Livy, *Ad Urbe Condita Pars IV: Libri XLI-XLV, Periochae, Fragmenta, Iulii Obsequentis Prodigiorum Liber*, ed. W. Weissenborn, M. Mueller, and O. Rossbach. Stuttgart, B. G. Teubner, 1959.

Nahj al-Balaghah, trans. S. Ali Reza. Elmhurst, Tahrike Tarsile, 1984.

The Periplus Maris Erythraei in L. Casson 1989, *The Periplus Maris Erythraei: text with introduction, translation and Commentary*. Princeton, Princeton University Press.

Pliny the Elder, *Natural History*, vols. 2 and 4, trans. H Rackham. Loeb Classical Library 370. Cambridge, MA, Harvard University Press, 2005 [1945].

Plutarch, *Lives*, vol. 9, trans. B. Perrin. Loeb Classical Library 101. Cambridge, MA, Harvard University Press, 2002 [1920].

Polybios, *Histories*, 6 vols., trans. W. R. Paton. Loeb Classical Library 128, 137-138, 159-161. Cambridge, MA, Harvard University Press, 2010 [1922].

Pseudo-Aristotle, *The Oeconomica* in Aristotle, vol. 18, trans. H. Tredennick. Loeb Classical Library 287. Cambridge, MA, Harvard University Press, 2006 [1935].

Strabo, *Geography*, vols. 7-8, trans. H. L. Jones. Loeb Classical Library 267. Cambridge, MA, Harvard University Press, 2001 [1932].

Xenophon, *Scripta Minora*, trans. E. C. Marchant. Loeb Classical Library 183. London, Harvard University Press, 2000 [1925]

II. EDITIONS OF PAPYRI:

PCZ = Edgar, C. C. 1925. *Zenon Papyri*. 5 vols. Cairo, Imprimerie de l'institut Français.

P. Hib. = Grenfell, B. P, A. S. Hunt, and E. G. Turner. 1906-1955. *The Hibeh Papyri*, 2 vols. London, Egypt Exploration Fund.

P. Lond. VII = Skeat, T. C, 1974. *Greek Papyri in the British Museum (now in the British Library), vol. 7: The Zenon Archive*. London, British Museum for the Library Board.

P. Petr. = Mahaffy, J. P. and W. M. Flinders Petrie. 1891-1905. *The Flinders Petrie papyri: with transcription, commentaries and index*, 3 vols. Dublin, Academy House.

P. Rev. =
Grenfell, B. P. and J. P. Mahaffy. 1896. *The Revenue Laws of Ptolemy Philadelphus*. Oxford, Clarendon Press.
Bingen, J. 1952. *Papyrus Revenue Laws*. Sammelbuch griechischer Urkunden aus Ägypten, Beiheft 1. Göttingen, Hubert.

P. Tebt. = Grenfell, B. P., A. S. Hunt, J. G. Smyly, E. J. Goodspeed, C. C. Edgar. 1902-1976. *The Tebtunis Papyri*, 4 vols. London, Oxford University Press.

P. Vindob. G 40822 = Casson, L. 1990. New Light on Maritime Loans: P. Vindob. G 40822. *AfP* 84, 195-206.

All texts also accessed at http://papyri.info/

III. EDITIONS OF INSCRIPTIONS:

Fraser, P. M. (ed.) 1959. *Samothrace: The Inscriptions on Stone*. New York, Pantheon.

OGIS = Dittenberger, W. 1960a [1903-1905]. *Orientis Graecae Inscriptiones Selectae*, 2 vols. Hildesheim, Olms.

Pithom Stela. In. K. Mueller. 2006. *Settlements of the Ptolemies: City Foundations and New Settlement in the Hellenistic World*, 192-199. Leuven, Pieters.

Rhodes, P.J. and R. Osborne (eds.). *Greek Historical Inscriptions 404-323 BC*. Oxford, Oxford University Press.

SEG = *Supplementum epigraphicum Graecum*. Leiden and Amsterdam 1923-.

Syll.^{3} = Dittenberger, W. 1960b [1915-1924]. *Sylloge Inscriptionum Graecarum*, 4 vols. Hildesheim, Olms.

Stroud, R. S. 1998. *The Athenian Grain-Tax Law of 374/3 B.C.* Princeton, The American School of Classical Studies at Athens.

Inscriptions also accessed at http://epigraphy.packhum.org/

IV. COIN HOARDS

IGCH = Thompson, M., O. Mørkholm, and C. M. Kraay. 1973. *An Inventory of Greek Coin Hoards*. New York, The American Numismatic Society.

V. COLLECTIONS OF ANCIENT TEXTS, PAPYRI, INSCRIPTIONS ETC. IN TRANSLATION:

Austin, M. M. 2006. *The Hellenistic world from Alexander to the Roman conquest: A selection of ancient sources in translation.* Cambridge, Cambridge University Press.

Bagnall, R.S. and P. Derow (eds.). 2004. *The Hellenistic Period: Historical Sources in Translation*. Padstow, Blackwell.

Burstein, S. M. 1985. *The Hellenistic Age from the battle of Ipsos to the death of Kleopatra VII*. Cambridge, Cambridge University Press.

Lichtheim, M. 1973. *Ancient Egyptian Literature, Volume 1: The Old and Middle Kingdoms*. Berkeley, University of California Press.

Redford, D. B. 1997. Textual Sources for the Hyksos Period. In *The Hyksos: New Historical and Archaeological Perspectives*, ed. E.D. Oren, 1-44. Philadelphia, University of Pennsylvania Museum.

VI. MODERN WORKS:

Albersmeier, S. 2010. Statues of Ptolemaic Queens, from Alexandria, Canopus and Heracleion-Thonis. In *Alexandria and the North-Western Delta*, ed. D. Robinson and A. Wilson, 191-201. Oxford, Oxford Centre for Maritime Archaeology.

Albrow, M. 1990. *Max Weber's Construction of Social Theory*. New York, St. Martin's Press.

Allam, S. 1991. Egyptian law courts in Pharaonic and Hellenistic times. *JEA* 77, 109-127.

Andréadès, A. M. 1932. *Des droits de douane preleves par les Lagides sur le commerce exterieur*. Paris, Les Presses universitaires de France.

Andréadès, A. M. 1934. De l'origine des monopoles ptolémaïque. In *Mélanges Maspero* 2, 289-295. Cairo, Institut français d'archéologie orientale.

Aperghis, G. G. 2004. *The Seleukid royal economy: The finances and financial administration of the Seleukid Empire*. Cambridge, Cambridge University Press.

Arnold, T. C. 2001. Rethinking Moral Economy. *The American Political Science Review* 95/1, 85-95.

Austin, M. M. 1970. *Greece and Egypt in the Archaic Age*. Cambridge, Cambridge Philological Society.

Austin, M. M. 1986. Hellenistic kings, war, and the economy. *CQ* 80, 450-466.

Ayrout, H. H. 1938. *The Fellaheen*. Cairo, R. Schindler.

Bagnall, R. S. 1969. Some notes on P. Hib. 198. *BASP* 6, 3/4, 73-118.

Bagnall, R. S. 1976. *The administration of the Ptolemaic Possessions outside Egypt*. Leiden, E.J. Brill.

Bagnall, R. S. 1984. The origins of Ptolemaic Cleruchs. *BASP* 21, 7-20.

Bagnall, R. S. 1997a. Decolonizing Ptolemaic Egypt. In *Hellenistic constructs: Essays in culture, history and historiography*, ed. P. Cartledge, P. Garnsey, and E. Gruen, 225-241. Berkeley, University of California Press.

Bagnall, R. S. (ed). 1997b. *The Kellis Agricultural Account Book*. Oxford, Oxbow Books.

Baines, J. 2004. Egyptian Elite Self-Presentation in the Context of Ptolemaic Rule. In *Ancient Alexandria between Egypt and Greece*, ed. W. V. Harris and G. Ruffini, 33-61. Leiden, Brill.

Bauschatz, J. 2007. The Strong Arm of the Law? Police Corruption in Ptolemaic Egypt. *The Classical Journal* 103/1, 13-39.

Bevan, E. R. 1927. *The house of Ptolemy: a history of Hellenistic Egypt under the Ptolemaic dynasty*. London, Metheun and co.

Bickermann, E. 1927. Beiträge zur antiken Urkundengeschichte I: Der Heimatsvermerk und die staatsrechtliche Stellung der Hellenen im ptolemäischen Ägypen. *AfP* 8, 216-239.

Bingen, J. 1952. *Papyrus Revenue Laws*. Sammelbuch griechischer Urkunden aus Ägypten, Beiheft 1. Göttingen, Hubert.

Bingen, J. 1978a. *Le papyrus Revenue-Laws: Tradition grecque et adaptation hellénistique*. Opladen. Republished as The Revenue Laws Papyrus: Greek tradition and Hellenistic adaptation, in J. Bingen 2007, 157-188.

Bingen, J. 1978b. Économie grecque et société égyptienne au IIIe siècle. In Das ptolemäischen Ägypten, ed. H Maehler and V. M Strocka, 211-219. Mainz, Philipp von Zabern. Reprinted in J. Bingen 2007, 215-228.

Bingen, J. 1984. Les tensions structurelles de la société ptolémaïque. In *Atti del XVII Congresso Internazionale di Papirologia* (Napoli, 19-26 maggio, 1983), 3, 921-937. Naples, Centro internazionale per lo Studio der papyri Ercolanesi. Reprinted in J. Bingen 2007, 189-205.

Bingen J. 2007. *Hellenistic Egypt: Monarchy, society, economy, culture*, ed. with an introduction by R.S. Bagnall, 15-30. Berkeley, University of California Press.

Bissa, E. M. A. 2009. *Governmental Intervention in Foreign Trade in Archaic and Classical Greece.* Leiden, Brill.

Bjerre Finnestad, R. 1997. Temples of the Ptolemaic and Roman periods: Ancient traditions in new contexts. In *Temples of Ancient Egypt*, ed. B. E. Shafer, 185-237. London, I.B. Tauris.

Bleiberg, E. 1996. *The Official Gift in Ancient Egypt*. Norman, University of Oklahoma Press.

Blundell, M. W. 1989. *Helping Friends and Harming Enemies: A study in Sophocles and Greek Ethics*. Cambridge, Cambridge University Press.

Bogaert, R. 1998-1999. Les opérations des banques de l'Egypt ptolémaïque. *Ancient Society* 29, 49-145.

Booth, W. J. 1994. On the Idea of the Moral Economy. *The American Political Science Review*, 88/3, 653-667.

Bostaph, S. 1994. The Methodenstreit. In *The Elgar Companion to Austrian Economics*, ed. P. Boettke, 459-464. Cheltenham, Edward Elgar.

Boulay, T. 2015. Wine Appreciation in Ancient Greece. In *A Companion to Food in the Ancient World*, ed. J. Wilkins and R. Nadeau, 273-283. Chichester, Wiley-Blackwell.

Bowman, A. B. 1986. *Egypt after the Pharaohs.* Berkele, University of California Press.

Bresson, A. 2012. Wine, Oil and Delicacies at the Pelousion Customs. In *Das imperiale Rom und der hellenistische Osten*, ed. J. Deininger and L. Günther, 71-88. Stuttgart, Steiner.

Burstein S.M. 1996. Ivory and Ptolemaic exploration of the Red Sea: the missing factor. *Topoi* 6, 799-807.

Burstein S. M. 2008. Elephants for Ptolemy II: Ptolemaic Policy in Nubia in the Third Century BC. In *Ptolemy Philadelphus and his world*, ed. P. McKechnie and P. Guillame, 135-147. Leiden, E. J. Brill.

Butzer, K. 1976. *Early Hydraulic Civilization in Egypt: A study in Cultural Ecology*. Chicago, Chicago University Press.

Butzer, K. 1980. Long-term Nile flood variation and political discontinuities in Pharaonic Egypt. In *The causes and consequences of food production in Africa*, ed. J. Desmond Clark and S.A. Brandt, 1-36. Berkeley, University of California Press.

Butzer, K. 1999. Irrigation. In *Encyclopedia of the Archaeology of Ancient Egypt*, ed. K. A. Bard, 381-382. London, Routledge.

Cankardeş-Şenol, G. and A. K. Şenol. 2013. Preliminary Remarks on Cypriot Amphorae and Stamps from Alexandria. In *The Transport Amphorae and Trade of Kypros*, ed. M. L Lawall, J. Lund. Aarhus, Aarhus University Press.

Casson, L. 1954. The Grain Trade of the Hellenistic World. *Transactions and Proceedings of the American Philological Society* 85, 168-187.

Casson, L. 1990. New Light on Maritime Loans: P. Vindob. G 40822. *AfP* 84, 195-206.

Casson, L. 1994. *Ships and Seafaring in Ancient Times*. London, British Museum Press.

Chamoux, F. 2001. *Hellenistic Civilization*. Oxford, Blackwell.

Chaniotis, A. 2005. *War in the Hellenistic World: a Social and Cultural History*. Oxford, Blackwell.

Chauveau, M. 2003. Démotique. *École pratique des hautes études. Section des sciences historiques et philologiques* 134/17, 4-7.

Chauveau, M. 2006. Irrigation et exploitation de la terre dans l'oasis de Kharga à l'époque perse. *CRIPEL* 25, 157-163.

Christiansen, E. 2004. *Coinage in Roman Egypt: the hoard evidence*. Aarhus, Aarhus University Press.

Clarysse, W. 1979. Egyptian estate-holders in the Ptolemaic period. In *State and Temple Economy in the Ancient Near East*, vol. 2, ed. E Lipinksi, 731-743. Leuven, Departement Oriëntalistiek.

Clarysse, W. 1980. A Royal Visit to Memphis and the End of the Second Syrian War. In *Studies on Ptolemaic Memphis, Studia Hellenistica 24*, 85-89.

Clarysse, W. 1993. Egyptian scribes writing Greek. *CdE* 68, 186-201.

Clarysse, W. and D.J. Thompson. 2006. *Counting the People in Hellenistic Egypt*, 2 vols. Cambridge, Cambridge University Press.

Clarysse, W. and K. Vandorpe. 1995. *Zénon, Un Homme d'Affairs grec à l'Ombre des Pyramides*. Louvain, Louvain University Press.

Clarysse, W. and K. Vandorpe. 1997. Viticulture and wine consumption in the Arsinoite nome (P. Köln V 221). *Ancient Society* 28, 67-73.

Clarysse, W. and K. Vandorpe. 1998. The Ptolemaic Apomoira. In *Le Culte du Souverain dans l'Égypte ptolémaïque au IIIe Siècle avant notre Ère*, Actes du colloque international, Bruxelles 10 mai 1995, ed. H Melaerts, *Studia Hellenistica* 34, 5-42.

Clarysse, W. 2010. Egyptian Temples and Priests: Graeco- Roman. In *A Companion to Ancient Egypt*, ed. A.B. Lloyd, 274-290. Chichester, Wiley-Blackwell.

Coase, R. H. 1960. The Problem of Social Cost. *Journal of Law and Economics* 3, 1-44.

Cohen, E. E. 1992. *Athenian Economy and Society: A banking perspective*. Princeton, Princeton University Press.

Cottier, M. 2010. The Customs Districts of Roman Egypt. *Proceedings of the Fifth International Congress of Papyrology, Ann Arbor 2007*, 141-148.

Crawford, D. J. 1971. *Kerkeosiris: An Egyptian village in the Ptolemaic period.* Cambridge, Cambridge University Press.

Crawford, D.J. 1978. The Good Official of Ptolemaic Egypt. In *Das ptolemäische Ägypten, Akten des Internationalen Symposions 27-29 September 1976 in Berlin*, ed. H. Maehler and V. M. Strocka, 192-202. Mainz, Philipp von Zabern.

Crawford, D.J. 1979. Food: tradition and change in Hellenistic Egypt. *World Archaeology* 11, 136-146.

Criscuolo, L. 2011. Observations on the Economy in Kind in Ptolemaic Egypt. In *The Economies of Hellenistic Societies, Third to First Centuries BC.*, ed. Z. H. Archibald, J. K. Davies, V. Gabrielsen, 166-176. New York, Oxford University Press.

Cuvigny, H. 1985. *L'arpentage par espèces dans l'Égypte ptolémaïque d'après les papyrus grecs.* Papyrologica Bruxellensia 20. Brussels, Fondation Égyptologique Reine Élisabeth.

Darnell, J. C., D. Klotz and C. Manassa. 2013. Gods on the Road: The Pantheon of Thebes at Qasr el-Ghueita. In *Documents de Théologies Thébaines Tardives* 2, ed. C. Thiers, 1-31. Montpellier, Universiteì Paul-Valeìry-Montpellier III.

Davies, J. K. 1984. Cultural, Social and Economic features of the Hellenistic World. In *CAH*, vol. 7/1, 257-320. Cambridge, Cambridge University Press.

Delia, D, 1993. The Ptolemies and the Ideology of Kingship: Response. In *Hellenistic History and Culture*, ed. P. Green, 192-204. Oxford, University of California Press.

Duncan-Jones, R. P. 1974. *The Economy of the Roman Empire: Quantitative Studies*. Cambridge, Cambridge University Press.
Duncan-Jones. R. P. 2006. Roman Customs Dues: A Comparative View. *Latomus* 65/1, 3-16.

Edgar, C. C. 1925. *Zenon Papyri*. 5 vols. Cairo, Imprimerie de l'institut Français.

Eisenstadt, S. N. 1963. *The Political Systems of Empires*. London, Free Press of Glencoe.

Ekelund, R. B. and R. F. Hebert. 1975. *A History of Economic Theory and Method*. New York, McGraw-Hill.

Ekelund, R. B. and R. D. Tollison. 1981. *Mercantilism as a rent-seeking society: economic regulation in historical perspective*. College station, Texas A&M University Press.

Ekelund, R. B. and R. D. Tollison. 1997. *Politicized Economies: Monarchy, Monopoly, and Mercantilism*. College Station, Texas A&M University Press.

Engen, D. T. 2005. Ancient Greenbacks: Athenian Owls, the Law of Nikophon, and the Greek Economy. *Historia* 54, 4, 350-381.

Erman, A. and U. Wilcken. 1900. Die Naukratisstele. In *Zeitschrift für Ägyptische Sprache und Altertumskunde* 38, 127-135.

Eyre, C. 1994. The water regime for orchards and plantations in Pharaonic Egypt. *JEA* 80, 57-80.

Evans, J. A. S. 1961. *A Social and Economic History of an Egyptian Temple in the Graeco-Roman Period*. New Haven, Yale University Press.

Finley, M. I. 1973. *The Ancient Economy*. London, Chatto & Windus.

Finley, M. I. 1985. *Ancient History: Evidence and Models*. London, Chatto & Windus.

Fischer-Bovet, C. 2014. *Army and society in Ptolemaic Egypt*. Cambridge, Cambridge University Press.

Fraser, P. M. 1972. *Ptolemaic Alexandria*, 3. Vols. Oxford, Clarendon Press.

French, A. 1990. Economic Conditions in Fourth-Century Athens. *Greece & Rome* 38/1, 22-40.

Gabrielsen, V. 2001. The Rhodian associations and economic activity. In *Hellenistic Economies*, ed. Z. H. Archibald, J. Davies, V. Gabrielsen, G. J. Oliver, 215-244. London, Routledge.

Gabrielsen, V. 2013. Rhodes and the Ptolemaic Kingdom: The Commercial Infrastructure. In *The Ptolemies, The Sea and the Nile: Studies in Waterborne Power*, ed. D. J. Thompson, M. Stefanou, and K. Buraselis, 66-81. Cambridge, Cambridge University Press.

Giddy, L.L. 1987. *Egyptian Oases: Bahariya, Dakhla, Farafra and Kharga During Pharaonic Times*. Warminster, Aris & Phillips.

Gill, J. C. R. 2014. *The Western Desert of Egypt during the Ptolemaic Period: A view from Dakhleh Oasis*. Unpublished PhD thesis.

Goddio, F. 2007. *The Topography and Excavation of Heracleion-Thōnis and East Canopus (1996-2000)*. Oxford, Oxford Centre for Maritime Archaeology.

Goddio, F. 2011. Heracleion-Thōnis and Alexandria, two ancient Egyptian emporia. In *Maritime Archaeology and Ancient Trade in the Mediterranean*, ed. D. Robinson and A. Wilson, 121-137. Oxford, Oxford Centre for Maritime Archaeology.

Goudriaan, K. 1988. *Ethnicity in Ptolemaic Egypt*. Amsterdam, J. C. Gieben.

Graeber, D. 2011. *Debt: The First 5,000 Years*. Brooklyn, Melville House.

Grampp, W. D. 1993. An Appreciation of Mercantilism. In *Mercantilist Economics*, ed. L. Magnusson, 59-85. Boston, Kluwer Academic Publishers.

Grenfell, B. P. and J. P. Mahaffy. 1896. *The Revenue Laws of Ptolemy Philadelphus*. Oxford, Clarendon Press.

Grenier, J. C. 1979. *Temples ptolémaïques et romains: répertoire bibliographique: index des citations 1955-1974, incluant l'index des citations de 1939 à 1954 réunies par N. Sauneron*. Cairo, Institut français d'archéologie orientale du Caire.

Habicht, C. 1992. Athens and the Ptolemies. *Classical Antiquity* 11/1, 68-90.

Harper, G. M. 1934a. Tax Contractors and their Relation to Tax Collection in Ptolemaic Egypt. *Aegyptus* 14, 1, 49-64.

Harper, G.M. 1934b. The Relation of Ἀρχώνης, Μέτοχοι, and Ἔγγυοι to each other, to the Government and to the Tax Contract in Ptolemaic Egypt. *Aegyptus* 14, 2/3, 269-285.

Hauben, H. 1971. An Annotated List of Ptolemaic Naukleroi with a Discussion of BGU X 1933. *Zeitschrift für Papyrologie und Epigraphik* 8, 259-275.

Hauben, H. 1985. The Guard Posts of Memphis. *Zeitschrift für Papyrologie und Epigraphik* 60, 183-187.

Hazzard, R. A. 2000. *Imagination of a Monarchy: Studies in Ptolemaic Propaganda*. Toronto, University of Toronto Press.

Hendy, M. F. 1985. *Studies in the Byzantine Monetary Economy c.300-1450*. Cambridge, Cambridge University Press.

Heichelheim, F. M. 1953. Recent Discoveries in Ancient Economic History. *Historia 2/2*, 129-135.

Heichelheim, F. M. 1970 [1938]. *An Ancient Economic History*, 3 vols. Leyden, A.W. Sythoff.

Hölbl, G. 2001. *A History of the Ptolemaic Empire*, trans. T. Saavedra. London, Routledge.

Holleaux, M. 1969 [1921]. *Rome, La Grèce et les Monarchies Hellénistiques au IIIe siècle avant J.-C. (273-205)*. Hildesheim, Georg Olms.

Hopkins, K. 1983. Introduction. In *Trade and the ancient economy*, ed. P. Garnsey, K. Hopkins, and C. R. Whittaker, ix-xxv. Berkeley, University of California Press.

Horwitz, S. 1994. Inflation. In *The Elgar Companion to Austrian Economics*, ed. P. Boettke, 402-407. Cheltenham, Edward Elgar.

Huzar, E. G. 1966. Egyptian Influences on Roman Coinage in the Third Century BC. *The Classical Journal* 61, 8, 337-346.

Inalcik, H. and D. Quatert. 1994. *An Economic and Social History of the Ottoman Empire, 1300-1914*. Cambridge, Cambridge University Press.

Janssen, J. J. 1975a. *Commodity prices from the Ramessid period*. Leiden, E.J. Brill.

Janssen, J. J 1975b. Prolegomena to the study of Egypt's economic history during the New Kingdom. *SAK* 3, 127-185.

Jenkins, G. K. 1967. The monetary system in the early Hellenistic times with special regard to the economy of the Ptolemaic kings. In *Patterns of Development in Phoenicia and Palestinian Antiquity*, ed. A. Kindler, 53-74. Tel Aviv, Schocken.

Johnson, J. H. 1986. The Role of the Egyptian Priesthood in Ptolemaic Egypt. In *Egyptological Studies in Honor of Richard A. Parker*, ed. L. H. Lesko, 70-84. Hanover, NH, University Press of New England.

Johnson, J. H. 1987. Ptolemaic Bureaucracy from an Egyptian point of view. In *The Organization of Power: Aspects of Bureaucracy in the Ancient Near East*, ed. M. Gibson and R. C. Biggs, 141-149. Chicago, Oriental Institute.

Jones, D. W. 2014. *Economic Theory and the Ancient Mediterranean*. Chichester, Wiley-Blackwell.

Kaper, O. E. 1992. Egyptian Toponyms of Dakhla Oasis. *Bulletin de l'Institut Français d'Archéologie Orientale* 92, 117-132.

Kaper, O. E. 2012. Epigraphic Evidence from the Dakhleh Oasis in the Late Period. In *The Oasis Papers 6: Proceedings of the Sixth International Conference of the Dakhleh Oasis Project*, ed. R. S. Bagnall, P. Davoli, and C. A. Hope, 167-176. Oxford, Oxbow Books.

Kemp, B. J. 1979. Review of Commodity prices from the Ramessid period. An Economic Study of the Village of Necropolis Workmen in Thebes by Jac. J. Janssen. *JEA* 65, 182-187.

Kemp, B. J. 2006. *Ancient Egypt: Anatomy of a Civilization*, 2nd revised edition. London, Routledge.

Kirzner, I. M. 1994. Value-freedom. In *The Elgar Companion to Austrian Economics*, ed. P. Boettke, 313-319. Cheltenham, Edward Elgar.

Krugman, P and R. Wells. 2009. *Microeconomics*, 2nd ed. New York, Worth Publishers.

Kurth, D. 1997. The present state of research into Graeco-Roman temples. In *The temple in Ancient Egypt: New discoveries and recent research*, ed. S. Quirke, 152-158. London, British Museum.

Levy, P. 1967 [1964]. *The Economic Life of the Ancient World*. Chicago, Chicago University Press.

Lewis, N. 1986. *Greeks in Ptolemaic Egypt: Case studies in the social history of the Hellenistic World*. Oxford, Clarendon Press.

Lloyd, A. B. 1982. Nationalist Propaganda in Ptolemaic Egypt. *Historia* 31, 1, 33-55.

Lloyd, A. B. 1983. The Late Period. In *Ancient Egypt: A Social History*, ed. B. G. Trigger, B. J. Kemp, D. O'Connor and A. B. Lloyd, 279-348. Cambridge, Cambridge University Press.

Lloyd, A. B. 2002. The Egyptian elite in the early Ptolemaic period: Some hieroglyphic evidence. In *The Hellenistic World: New Perspectives,* ed. D. Ogden, 117-136. London, Classical Press of Wales.

Loomis, W. T. 1998. *Wages, Welfare Costs and Inflation in Classical Athens*. Ann Arbor, University of Michigan Press.

Lorber, C. 2005. Development of Ptolemaic bronze coinage in Egypt. In *L'Exception égyptienne? Production et échanges monétaires en Égypte hellénistique et romaine*, ed. F. Durat and O. Picard, 135-149. Cairo, Institut français d'archéologie orientale.

Lucas. A. and J. R. Harris. 1989 [1962]. *Ancient Egyptian Materials and Industries*. London, Histories & Mysteries of Man.

Mankiw, N. G. 2012. *Principles of Microeconomics*, 6th ed. Mason, South Western Cengage Learning.

Mann, M. 1986. *The Sources of Social Power*. Cambridge, Cambridge University Press.

Manning, J. G. 2002. Irrigation et État en Égypte antique. *Annales. Histoire, Sciences Sociales*, 57/3, 611-623.

Manning, J. G. 2003. *Land and Power in Ptolemaic Egypt: The structure of land tenure*. Cambridge, Cambridge University Press.

Manning, J. G. 2007. Hellenistic Egypt. In *The Cambridge Economic History of the Greco-Roman World*, ed. W. Scheidel, I. Morris, and Richard Saller, 434-459. Cambridge, Cambridge University Press.

Manning, J. G. 2010. *The Last Pharaohs: Egypt under the Ptolemies, 305-30 BC*. Princeton, Princeton University Press.

Manning, J. G. 2011. Networks, Hierarchies, and Markets in the Ptolemaic Economy. In *The Economies of Hellenistic Societies, Third to First Centuries BC.*, ed. Z. H. Archibald, J. K. Davies, V. Gabrielsen, 296-323. New York, Oxford University Press.

Mattingly, H. 1960. *Roman Coins: From the Earliest Times to the Fall of the Western Empire*. London, Methuen & co.

Marquialle, C. 2008. The Foreign Policy of Ptolemy II. In *Ptolemy Philadelphus and his world*, ed. P. McKechnie and P. Guillame, 39-64. Leiden, E. J. Brill.

Meadows, A. 2001. Money, Freedom, and Empire in the Hellenistic World. In *Money and its uses in the ancient Greek World*, ed. A. Meadows and K. Shipton, 53-63. New York, Oxford University Press.

Meredith, D. 1953. Annius Plocamus: Two Inscriptions from the Berenice Road. *Journal of Roman Studies* 43, 38-40.

Migeotte, L. 2009. *The Economy of the Greek Cities: from the Archaic Period to the Early Roman Empire*, trans. J. Lloyd. Berkeley, University of California Press.

Mills, A.J. 1999. Pharaonic Egyptians in Dakhleh Oasis. In *Reports from the survey of the Dakhleh Oasis 1977 -1987*, eds. C.S. Churcher and A. J. Mills, 171-178. Oxbow Books, Oxford.

Milne, J. G. 1939. Trade between Greece and Egypt before Alexander the Great. *JEA* 25/2, 177-183.

Mises, L. 1998 [1949]. *Human Action*. Auburn, Ludwig von Mises Institute.

Möller, A. 2000. *Naukratis: Trade in archaic Greece*. New York, Oxford University Press.

Möller, A. 2007. Classical Greece: Distribution. In *The Cambridge Economic History of the Greco-Roman World*, ed. W. Scheidel, I. Morris, and Richard Saller, 362-384. Cambridge, Cambridge University Press.

Mooren, L. 1977. *La Hiérarchie de Cour Ptolémaïque*. Lovanii.

Monson, A. 2007. Royal Land in Ptolemaic Egypt: A Demographic Model. *Journal of the Economic and Social History of the Orient* 50/4, 363-397.

Monson, A. 2012a. *From the Ptolemies to the Romans: Political and Economic Change in Egypt*. Cambridge, Cambridge University Press.

Monson, A. 2012b. *Agriculture and Taxation in early Ptolemaic Egypt: Demotic land surveys and accounts (P. Agri*). Bonn, Habelt Verlag.

Mørkholm, O. 1982. Some reflections on the production and use of coinage in ancient Greece. *Historia* 31, 290-305.

Morris, I. and J. G. Manning. 2005. Introduction. In *The Ancient Economy: Evidence and Models*, ed. J. G. Manning and I. Morris, 1-44. Stanford, Stanford University Press.

Morris, I., R. P. Saller, and W. Scheidel. 2007. Introduction. In *The Cambridge Economic History of the Graeco-Roman World*, ed. W. Scheidel, I. Morris, and R. P. Saller, 1-12. Cambridge, Cambridge University Press.

Mueller, K. 2006. *Settlements of the Ptolemies: City foundations and new settlement in the Hellenistic World*. *Studia Hellenistica* 43. Leuven, Pieters.

Muhs, B. 2005. *Tax receipts, taxpayers, and taxes in early Ptolemaic Thebes.* Chicago, Oriental Institute.

Murray, G. W. and E. H. Warmington. 1967. Trogodytica: the Red Sea Littoral in Ptolemaic Times. *The Geographical Journal* 133/1, 24-33.

Mundell, R. A. 2002. The Birth of Coinage. *Columbia University Department of Economics Discussion Papers*, 0102-08, 1-42.

Nafissi, M. 2005. *Ancient Athens & Modern Ideology: Value, Theory & Evidence in Historical Sciences; Max Weber, Karl Polanyi & Moses Finley*. London, Institute of Classical Studies.

Newell, E. T. 1941. Appendix 1: The coins found in the excavation of the temple. In H.E. Winlock, *The Temple of Hibis in el Khargeh Oasis*. New York, Metropolitan Museum of Art Egyptian Expedition.

North, D. C. 1981. *Structure and change in economic history.* New York, Norton.

Oikonomides, N. 1997. The economic region of Constantinople: from directed economy to free economy and the role of the Italians. *Europa Medievale e Mondo Bizantino: Contatti effettivi e possibilita di studi comparati*, ed. G. Arnaldi and G. Cavallo. Roma, Instituto Storico Italiano per il Medio Evo.

O'Leary, B. 1989. *The Asiatic Mode of Production: Oriental despotism, historical materialism and Indian history*. Oxford, Blackwell.

O'Neil, J. L. 2006. Places and Origin of the Officials of Ptolemaic Egypt. *Historia* 55/1, 16-25.

O'Neil, J. L. 2008. A Re-Examination of the Chremonidean War. In *Ptolemy Philadelphus and his world*, ed. P. McKechnie and P. Guillame, 65-89. Leiden, E. J. Brill.

Orrieux, C. 1983. *Les Papyrus de Zénon: L'horizon d'un grec en Égypte au III*e *Siècle avant J.C.* Paris, Macula.

Orrieux, C. 1985. *Zénon de Caunos, parépidémos, et le destin grec.* Paris, Belles Lettres.

Osborne, R. 2007. Archaic Greece. In *The Cambridge Economic History of the Greco-Roman World*, ed. W. Scheidel, I. Morris, and Richard Saller, 277-301. Cambridge, Cambridge University Press.

Peremans, W. 1970. Sur l'identification des égyptiens et des étrangers dans l'Égypte des Lagides. *Ancient Society* 1, 25-38.

Peremans, W. 1971. Egyptiens et étrangers dans l'administration civile et financière de l'Egypte ptolémaïque. *Ancient Society* 2, 33-45.

Peremans, W. 1975. Ptolémée IV et les Égyptiens. In *Le Monde Grec: pensée littérature histoire documents, hommages à Claire Préaux*, ed. J. Bingen, G. Cambier. G. Nachtergael, 393-402. Bruxelles, Éditions de l'Université de Bruxelles.

Pestman, P. W. 1981. *A Guide to the Zenon Archive*. Leiden, E.J. Brill.

Pikous, N. N. 1970. A propos de la διαγραφὴ τοῦ σπόρου. In *Proceedings of the Twelfth International Congress of Papyrology*, ed. D. H. Samuel, 407-410. Toronto, Hakkert.

Polacek, V. 1970. *P. Teb.*703, Its Significance Then and Today. In *Proceedings of the Twelfth International Congress of Papyrology*, ed. D. H. Samuel, 411-426. Toronto, Hakkert.

Polanyi, K. 1944. *The Great Transformation*. London, V. Gollancz.

Polanyi, K. (ed.) 1957. *Trade and Market in the Early Empires*. Glencoe, Free Press.

Polanyi, K. 1977. *The Livelihood of Man*, ed. H. W. Pearson. London, Academic Press.

Poo, M. 1995. *Wine and Wine Offering in the Religion of Ancient Egypt*. London, Kegan Paul International.

Porten, B. 1968. *Archives from Elephantine: The life of an ancient Jewish Military Colony*. Berkeley, University of California Press.

Préaux, C. 1933. Quelques défauts de la politique intérieure de Ptolémée Philadelphe. *Aegyptus* 13 3/4, 547-554.

Préaux, C. 1936a. Un problème de la politique des Lagides : la faiblesse des édits. In *Atti del IV Congresso internazionale di Papirologia*. Milan, Cisalpino-La Goliardica.

Préaux, C. 1936b. Politique de race ou Politique royale? *CdE* 11, 111-138.

Préaux, C. 1939. *L'économie royale des Lagides*. Bruxelles, Fondation Égyptologique Reine Élisabeth.

Préaux, C. 1947. *Les Grecs en Égypte d'après les archives de Zénon*. Bruxelles, Office de Publicité.

Préaux, C. 1954. Sur les origines des monopoles lagides. *CdE* 29, 312-327.

Préaux, C. 1978. *Le monde hellénistique: la Grèce et l'Orient de la mort d'Alexandre à la conquête romaine de la Grèce, 323-146 av. J.-C.* Paris, Presses universitaires de France.

Rathbone, D. W. 2000. Ptolemaic to Roman Egypt: The death of the *dirigiste* state? In *Production and Public Powers in Classical Antiquity*, ed. E. Lo Cascio and D. W. Rathbone, 44-54. Cambridge, Cambridge University Press.

Rathbone, D. W. 2007. Roman Egypt. In *The Cambridge Economic History of the Greco-Roman*

World, ed. W. Scheidel, I. Morris, and Richard Saller, 698-719. Cambridge, Cambridge University Press.

Redmount, C. A. 1995. The Wadi Tumilat and the Canal of the Pharaohs. *Journal of Near Eastern Studies* 54/2, 127-135.

Reekmans, T. 1951. The Ptolemaic copper inflation. *Studia Hellenistica* 7, 61-119.

Reekmans, T. 1994. The Behavior of Consumers in the Zenon Papyri. Ancient Society 25, 119-140.

Rostvtzeff, M. 1908. Zur Geschichte des Ost- und Südhandels im ptolemäischen Ägypten. *AfP* 4, 298-315.

Rostovtzeff, M. 1920. The foundations of social and economic life in Egypt in Hellenistic times. *JEA* 6, 161-178.

Rostovtzeff, M. 1922. *A Large Estate in Egypt in the Third Century BC: A Study in Economic History*. Madison, University of Wisconsin Press.

Rostovtzeff, M. 1932. Foreign Commerce of Ptolemaic Egypt. *Journal of Economic and Business History* 4/4, 728-769.

Rostovtzeff, M. 1941. *The Social and Economic History of the Hellenistic World*, 3 vols. Oxford, Clarendon Press.

Rothbard, M. N. 2004 [1962]. *Man, Economy, and State*. Auburn, Ludwig von Mises Institute.

Rowlandson, J. 1985. Freedom and Subordination in Ancient Agriculture: The Case of the *Basilikoi Georgoi* of Ptolemaic Egypt. In Crux: Essays in Greek History presented to G.E.M de Ste. Croix on his 75th birthday, ed. P. A. Cartledge and F. D. Harvey, 327-347. Exeter, Imprint Academic.

Rowlandson, J. 2001. Money use among the peasantry of Ptolemaic and Roman Egypt. In *Money and its uses in the ancient Greek World*, ed. A. Meadows and K. Shipton, 145-155. New York, Oxford University Press.

Rowlandson, J. 2003. Approaching the peasantry of Greco-Roman Egypt: From Rostovtzeff to rhetoric. In *Views of ancient Egypt since Napoleon Bonaparte: Imperialism, Colonialism, and Modern Appropriations*, ed. D. Jeffreys, 147-152. London, UCL Press.

Rowlandson, J. 2005. Town and Country in Ptolemaic Egypt. In *A Companion to the Hellenistic World*, ed. A. Erskine, 249-263. Oxford, Blackwell.

Rowlandson, J. 2007. The Character of the Ptolemaic Aristocracy: Problems of definition and evidence. In *Jewish Perspectives on Hellenistic Rulers*, ed. T. Rajak, S. Pearce, J. Aitken, and J. Dines, 29-49. Berkeley, University of California Press.

Samuel, A. E. 1966a. The internal organization of the Nomarch's bureau in the Third Century BC. In *Essays in honor of C. Bradford Welles*, 213-229. New Haven, American Society of Papyrologists.

Samuel, A. E. 1966b. The Judicial Competence of the *oikonomos* in the Third Century BC. *Atti dell' XI Congresso internazionale di Papirologia*. Milan, Istituto Lombardo di Scienze e Lettere.

Samuel, A. E. 1970. The Greek Element in the Ptolemaic Bureaucracy. In *Proceedings of the Twelfth International Congress of Papyrology*, ed. D. H. Samuel, 443-453. Toronto, Hakkert.

Samuel, A. E. 1971. P. Tebt. 703 and the *oikonomos*. In *Studi in onore di Edoardo Volterra*, Pubblizazioni della Facolta di girurisprudenza dell'Universita di Roma, vol. 2, 451-460. Milan, Giuffre.

Samuel, A. E. 1983. *From Athens to Alexandria: Hellenism and Social Goals in Ptolemaic Egypt*. *Studia Hellenistica* 26.

Samuel, A. E. 1984. The money economy and the Ptolemaic peasantry. *BASP* 21, 187-206.

Samuel, A.E. 1989. *The shifting sands of history: Interpretations of Ptolemaic Egypt*. Lanham, University Press of America.

Samuel, A.E. 1993. The Ptolemies and the Ideology of Kingship. In *Hellenistic History and Culture*, ed. P. Green, 168-192. Oxford, University of California Press.

Sandy, D. B. 1989. *The Production and Use of Vegetable Oils in Ptolemaic Egypt*. *BASP* Supplement, vol. 6.

Sauneron, S. 2000 [1957]. *The Priests of Ancient Egypt*. Ithaca, Cornell University Press.

Scullard, H. H. 1974. *The Elephant in the Greek and Roman World*. Ithaca, Cornell University Press.

Sidebotham, S. E. 1986. *Roman Economic Policy in the Erythra Thalassa 30 B.C. – A.D. 217*. Leiden, E.J. Brill.

Sidebotham, S. E. 2011. *Berenike and the Ancient Maritime Spice Route*. Berkeley, University of California Press.

Sijpesteijn, P. J. 1987. *Customs Duties in Graeco-Roman Egypt*. Zutphen, Terra Publishing.

Silver, M. 1985. *Economic Structures of the Ancient Near East*. Sydney, Croom Helm.

Silver, M. 1995. *Economic Structures of Antiquity*. Westport, Greenwood Press.

Strootman, R. 2013. Dynastic Courts of the Hellenistic Empires. In *A Companion to Ancient Greek Government,* ed. H. Beck, 38-53. Chichester, Wiley-Blackwell.

Tarn, W. W. 1928. Ptolemy II. *JEA* 14 3/4, 246-260.

Tarn, W. W. 1929. Ptolemy II and Arabia. *JEA* 15 1/2, 9-25.

Thomas, J. D. 1978. Aspects of the Ptolemaic Civil Service: The Dioiketes and the Nomarch. In *Das ptolemäische Ägypten, Akten des Internationalen Symposions 27-29 September 1976 in Berlin*, ed. H. Maehler and V. M. Strocka, 187-194. Mainz, Philipp von Zabern.

Thompson, D. J. 1983. Nile Grain Transport under the Ptolemies. In *Trade and the ancient economy*, ed. P. Garnsey, K. Hopkins, and C. R. Whittaker, 64-75. Berkeley, University of California Press.

Thompson, D. J. 1984. Agriculture. In *CAH*, vol. 7/1, 363-370. Cambridge, Cambridge University Press.

Thompson, D. J. 1988. *Memphis under the Ptolemies*. Princeton, Princeton University Press.

Thompson, D. J. 1992a. Literacy and the Administration in Early Ptolemaic Egypt. In *Life in a Multi-Cultural Society: Egypt from Cambyses to Constantine and beyond*, ed. J. H. Johnson, 323-326. Chicago, The Oriental Institute of the University of Chicago.

Thompson, D. J. 1992b. Language and Literacy in Early Hellenistic Egypt. In *Ethnicity in Hellenistic Egypt*, ed. P. Bilde, T. Engberg-Pedersen, L. Hannestad, and J. Zahle, 39-52. Aarhus, Aarhus University Press.

Thompson, D. J. 1994. Literacy and Power in Ptolemaic Egypt. In *Literacy and Power in the Ancient World*, ed. A. K. Bowman and G. Woolf, 67-83. Cambridge, Cambridge University Press.

Thompson, D. J. 1997. The infrastructure of splendour: Census and taxes in Ptolemaic Egypt. In *Hellenistic Constructs: Essays in Culture, History and Historiography*, ed. P. Cartledge, P. Garnsey, and E. Gruen, 242-257. Berkeley, University of California Press.

Thompson, D. J. 1999a. Irrigation and Drainage in the early Ptolemaic Fayyum. In *Agriculture in Egypt: From Pharaonic to Modern times*, ed. A. K. Bowman and E. Rogan, 107-122. Oxford, Oxford University Press.

Thompson, D. J. 1999b. New and Old in the Ptolemaic Fayyum. In *Agriculture in Egypt: From Pharaonic to Modern times*, ed. A. K. Bowman and E. Rogan, 123-138. Oxford, Oxford University Press.

Thompson, D. J. 2001a. Hellenistic Hellenes: The case of Ptolemaic Egypt. In *Ancient Perceptions of Greek ethnicity*, ed. I. Malkin, 301-322. Cambridge, Harvard University Press.

Thompson, D. J. 2001b. *Ethnē*, taxes and administrative geography in early Ptolemaic Egypt. In *Atti del XXII Congresso internazionale di Papirologia*, vol. 2, 1255-1263. Florence, Istituto Papirologica G. Vitelli.

Thompson, D. J. 2008. Economic Reforms in the mid-reign of Ptolemy Philadelphus II. In *Ptolemy Philadelphus and his world*, ed. P. McKechnie and P. Guillame, 27-38. Leiden, E. J. Brill.

Thompson, D. J. 2009. The Multilingual Environment of Persian and Ptolemaic Egypt: Egyptian, Aramaic, and Greek Documentation. In *The Oxford Handbook of Papyrology*, ed. R. S. Bagnall, 395-417. New York, Oxford University Press.

Thompson, D. J. 2011. Animal Husbandry in Ptolemaic Egypt. In *The Economies of Hellenistic Societies, Third to First Centuries BC.*, ed. Z. H. Archibald, J. K. Davies, V. Gabrielsen, 390-401. New York, Oxford University Press.

Tomber, R. 2012. From the Roman Red Sea to Beyond the Empire: Egyptian ports and their trading partners. *British Museum Studies in Ancient Egypt and Sudan* 18, 201-215.

Treadgold, W. 1997. *A History of the Byzantine State and Society*. Stanford, Stanford University Press.

Turner, E. G. 1984. Ptolemaic Egypt. In *CAH*, vol. 7/1, 118-174. Cambridge, Cambridge University Press.

Uytterhoeven, I. 2003. Tanis (meris of Herkleides), Fayum project. www.trismegistos.org/fayum/fayum2/2251.php?geo_id=2251

Vandorpe, K. 2000. The Ptolemaic epigaphe or harvest tax (shemu). *AfP* 46, 165-228.

Vandorpe, K. 2006. Agriculture, temples and tax law in Ptolemaic Egypt. *CRIPEL* 25, 165-171.

van Minnen, P. 2001. Dietary Hellenization or ecological transformation? Beer, wine and oil in later Roman Egypt. In *Atti del XXII Congresso internazionale di Papirologia, Firenze, 23-20 agosto 1998,* vol 2., ed. I. Andorlini, 1265-1280. Florence, Istituto papirologica G. Vitelli.

van 't-Dack, E. 1988. Sur l'évolution des institutions militaires Lagides. In *Ptolemaica selecta. Etudes sur l'armée et l'administration lagides*. Leuven, Leuven University Press.

Veïsse, A. 2004. *Les 'révoltes égyptiennes'. Recherches sur les troubles intérieurs en Égypte du règne de Ptolémée III à la conquête romaine*. Studia Hellenistica 41. Leuven; Paris; Dudley, Peeters.

Verhoogt, A. 1998. *Menches, Komogrammateus of Kerkeosiris: the doings and dealings of a village scribe in the late Ptolemaic Period (120-110 BC)*. Leiden, E. J. Brill.

Vidal-Naquet, P. 1967. *Le bordereau d'ensemencement dans l'Égypte ptolémaïque*. Brussels, Fondation Égyptologique Reine Élisabeth.

Vinson, S. 1998. *The Nile Boatman at Work*. Münchner Ägyptologische Studien 48. Mainz, von Zabern.

Vittmann, G. 2012. Demotische und kursivhieratische Ostraka aus Mut al-Kharab. In *The Oasis Papers 6: Proceedings of the Sixth International Conference of the Dakhleh Oasis Project*, ed. R. S. Bagnall, P. Davoli, and C. A. Hope, 19-31. Oxford, Oxbow Books.

von Bomhard, S. 2012. *The Decree of Sais*. Oxford, Oxford Centre for Maritime Archaeology.

von Reden, S. 2001. The politics of monetization in third-century BC Egypt. In *Money and its uses in ancient Greek world*, ed. A. Meadows and K. Shipton, 65-76. Oxford, Oxford University Press.

von Reden, S. 2006. The ancient economy and Ptolemaic Egypt. In *Ancient economies, modern methodologies: Archaeology, comparative history, models, and institutions*, ed. P. F. Bang, M. Ikeguchi, H. G. Ziche, 161-177. Bari, Edipuglia.

von Reden, S. 2007. *Money in Ptolemaic Egypt: From the Macedonian Conquest to the end of the third century BC.* Cambridge, Cambridge University Press.

von Reden, S. 2011. Demand Creation, Consumption, and Power in Ptolemaic Egypt. In *The Economies of Hellenistic Societies, Third to First Centuries BC.*, ed. Z. H. Archibald, J. K. Davies, V. Gabrielsen, 421-440. New York, Oxford University Press.

Wagner, G. 1987. *Les oases d'Égypte: À l'époque grecque, romaine et byzantine d'après les documents grecs*. Cairo, Institut Français d'Archéologie Orientale.

Walbank, F. W. 1984. Macedonia and Greece. In *CAH* 7/1. Cambridge, Cambridge University Press.

Wallace, S. L. 1938. *Taxation in Egypt: From Augustus to Diocletian*. Princeton, Princeton University Press.

Warburton, D. 1997. *State and Economy in ancient Egypt: Fiscal Vocabulary of the New Kingdom*. Fribourg, University Press.

Weber, M. 1976 [1909]. *The Agrarian Sociology of Ancient Civilizations*. London, NLB.

Westermann, W. L. 1926. Orchard and Vineyard Taxes in the Zenon Papyri. *JEA* 12, 1/2, 38-51.

Westermann, W. L. 1938. The Ptolemies and the welfare of their subjects. *The American Historical Review* 43/2, 270-287.

Will, E. 1985. Pour une 'anthropologie coloniale' du monde hellénistique. In *The Craft of the Ancient Historian*, ed. J. W. Eadie and J. Ober, 273-301. Lanham, University Press of America.

Winlock, H. E. 1941. *The Temple of Hibis in El Khargeh Oasis*. New York, Metropolitan Museum of Art Egyptian Expedition.

Wittfogel, K. 1957. *Oriental Despotism: A comparative study of total power*. New Haven, Yale University Press.

Young, G. K. 2001. *Rome's Eastern Trade: International commerce and imperial policy, 31 BC – AD 305*. London, Routledge.

Yoyotte, J. 1989. Le nom égyptien du 'ministre de l'économie' – de Saïs à Méroé. *Comptes rendus de l'Académie des Inscriptions et Belles-lettres 133/1, 73-90.*

Zingarelli, A. P. 2010. *Trade and market in New Kingdom Egypt: internal socio-economic processes and transformations*. Oxford, Archaeopress.