The Efficiency of Markets in Preindustrial Societies

Money, Markets and Price-Formation in Ptolemaic Egypt (323-30 BC)

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1 Introduction

Two years ago Bert van der Spek, Dominic Rathbone and I gave a joint paper about the development of prices in the Mediterranean during the Hellenistic period. Since then, I have been writing and rewriting this and similar papers, discovered errors in calculation and interpretation, but the basic results still stand.[1] These were the following:

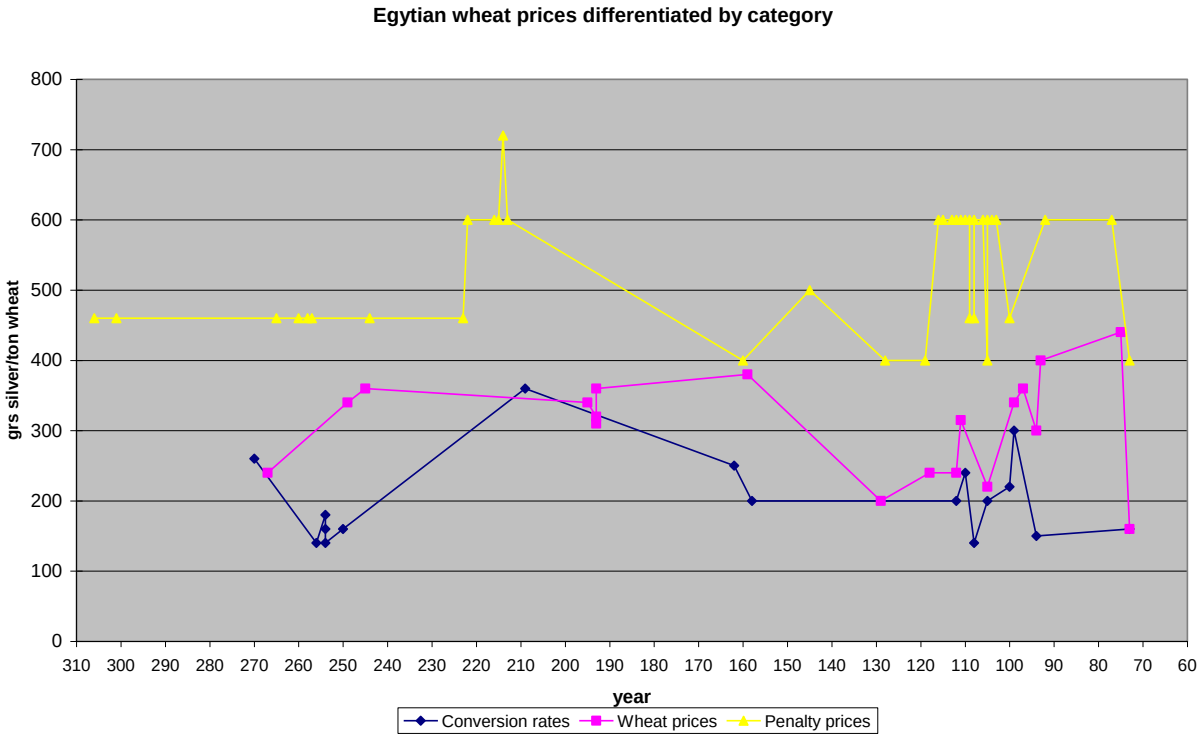
1) Only wheat prices have survived in sufficient quantity to come anywhere near a serial assessment of price development in Ptolemaic Egypt over time. There are some 100 pieces of price information extant, covering a period from c. 265 BC to c. 80 BC. They are derived from accounts, receipts, loan and tenancy contracts as well as personal correspondence. All of them come from Greek documents reflecting transactions in contexts dominated by Greeks and the Greek language. Most of them come from the Fayum and adjacent areas in Lower Egypt, which were areas of intense Greek settlement. Only two prices relate to the city of Alexandria and are, unsurprisingly, higher than those extant from the chora.

2) 25 per cent of the roughly 100 pieces of evidence can be regarded as prices relating to sale in one way or the other. Not all these transactions, however, can be assumed to have been market prices. Moreover, our price information frequently hides information which is vital for economic evaluation. Grain could be sold 'from the threshing floor' (thus excluding transport; costs of loss and risk), or delivered to the buyer; it could be sold in 'cleaned' and 'un-cleaned' condition which affected the nutritional value of the unit sold. There were also different measures used, depending on whether the grain was measured out in the 'giving' or 'receiving' measure. In addition, we rarely know the precise date of the sale (which could affect the price according to season); and normally we do not know surrounding factors, such as the

[1] Von Reden (2010), 141-156; Rathbone/van der Spek/von Reden in Baker & Jursa (forthcoming).

relationship of the transacting partner or the wider economic context of which the sale might have been a part. Thus our scanty data may not be always comparable.
15 per cent of our prices are conversion rates agreed between the transacting partners for converting payments in kind into monetary units and vice versa. These rates were anchored in a conventional system of converting different kinds of produce into each other, and of produce into cash. But negotiation was also possible.
60 per cent of the extant price information comes from the stipulation of so-called penalty payments for unfulfilled contractual obligations in kind (*epitimia*). These were agreed in tenancy contracts in the case that the rental obligation in kind remained unfulfilled. They seem to have been fixed at double the amount of the produce converted into its monetary equivalent. It is assumed that the penalty price was related to a 'usual' or 'typical' wheat price. During the third century, at a time of relative strong governmental control, the penalty price was based on a royal *prostagma* (decree), but whether this practice continued into the second and first century when the control of the central government on interpersonal transactions became weaker, we cannot be sure. Conversion rates and penalty prices are, as I just said, regarded as related to some real price, but how the perception of such real prices emerged, and how flexibly government and population reacted to changes in real levels of prices, again, we do not know.

3) Despite a certain amount of variation – for reasons of price volatility or else – there was a great degree of stability between the beginning of the 3rd century and c. 220 BC. Penalty prices were standard; conversion rates oscillated no more than c. 100 % per 40 l (1 *artaba*); and sale prices – of which we have only five different ones for this period - varied even less.



4) After c. 220 BC grain prices increased dramatically. *Epitimia* rose at first by no more than 150 per cent, but then sky-rocked by factors of 60, 120, 240, and finally another 20 times. Occasionally, they seem to have dropped again by similar factors and in short intervals. And, most confusingly, we have evidence from firmly dated documents which suggest that different price levels (or price systems) coexisted at the same time. Especially during the last 20 years of the 3rd century BC, there seem to have been some people using the old level of prices and some using the new ones - without a recognizable pattern for this different usage. It has long been argued that these changes in price were due to changes in the monetary system, rather than to real price inflation.[2] It was also generally agreed that these changes affected the value of bronze coinage only, rather than the monetary system as a whole. Payments made in real silver coins (not just made notionally in the silver standard) were not affected in the same way, although the price of the silver tetradrachm (the *stater*) also became variable. This we can see from loan agreements as well as from demotic contracts which had a different notation for monetary units reckoned in silver and real silver

[2] Reekmans (1948).

coins. Yet the exact story of the monetary reforms is far from clear. It is marred by chronological gaps in the evidence, by the fact that documents of similar date show different monetary systems in use, and that some contractual formulas (such as 'payable in *arguriou episēmou drachma'* (drachma of minted silver)) appear somewhat arbitrarily in contracts which do and do not seem to be related to payments made in real silver coin.[3] Last but not least, although the numismatic evidence does show changes in the bronze coinage during the period in question, these changes cannot be matched easily with the evidence from the papyri.[4] It is also puzzling that throughout the 3rd century BC the bronze coinage was changed frequently without prices, rents and taxes reacting to it.

I am fairly sure, however, that the model of monetary reforms offered by Reekmans and Maresch is closer to the truth than that of inflation offered by Cadell & le Rider.[5] The latter argue that there was real price inflation in Egypt after 217 BC, due to an outpour of monetary donations and payments to soldiers after the battle of Raphia, combined with grain shortage.[6] Reekmans and Maresch's model of deliberate retariffing of the bronze coinage at 1:60, 1:120 and 1:240 of its 3rd-century value render a plausible picture of the price rises of wheat - and further stability of real prices down to the 1st century BC. Unfortunately, the argument is circular. The monetary reforms which we know only from the changes in price given in the papyri are reconstructed on the basis of what is plausible in the light of prices between 260 and 220 BC.

5) However, the model of the monetary reform is derived not only from wheat prices but those of other products, wages and rents as well. This shows that prices for other foodstuff, wine, labour and animal transport as well as monetary rents and taxes were subject to the same kind of change. Thus we can conclude that the *price system* remained very stable over a period of 200 years.

[3] Maresch (1996) for discussion
[4] Huston & Lorber (2001)
[5] Cadell & Le Rider (1997)
[6] Bagnall (1999) for discussion

What do we make of this evidence? In the original paper I tried to relate the figures to questions of price development in the Mediterranean, and the methodological question of how to make compatible the information we have from different monetary systems. The papers of my colleagues and mine in combination also tried to answer the question whether there were similar and possibly contemporaneous changes of prices in Egypt, Rome and the Near East. And, if so, whether this might suggest any Mediterranean market in grain. Today I think that the price material I contributed from Egypt does not tell us anything at all about developments in local, regional or interregional markets. Firstly, as I just explained, we do not have in any but a handful of cases precise information about the conditions under which prices were agreed. In case of conversion rates we frequently know that the transacting partners had some social or economic relationship. But were those prices which we relate to sale settled under market conditions without the interference of interpersonal factors, or pre-existing economic relationships? Secondly, we cannot be sure about the relationship between interpersonal and officially set prices. Did government valuations of grain for penalty prices, taxes or royal rents affect prices reached interpersonally, or *vice versa*? What factors influenced negotiation of prices in the market? How much of our own economic system do we read into the data, if we argue for 'free' price formation *contra* 'governmental control' *contra* 'custom'? And how much, thirdly, did market prices matter in an economy where produce was distributed frequently as part of other economic relationships, as for example *sitometria* (grain rations) as part of labour contracts, conversion of salaries and rents, specific contractual agreements among landlords and tenants, and so on. If prices in the local market seemed high, consumers could turn to other sources, rather than to other markets; and if the prices paid for grain were unsatisfactory, sellers could find other profitable ways of dealing with their produce rather than turning to another market. As I have argued elsewhere, there was a very close interdependence of cash and kind in the Ptolemaic economy, and neither can we say that cash was more fungible than grain, nor that grain was mostly used for consumption.[7] Finally, one may wonder whether 'typical' or 'iconic' prices – which clearly did exist – were anchored in local perception and 'custom', or rather related to the power of social groups or governments who set standards (without 'controlling' prices). And if so, do we not have to take more seriously patterns of social and political structures than market conditions, if we note stability or change in price?

[7] Von Reden (2007 a) cf. Preisigke (1910).

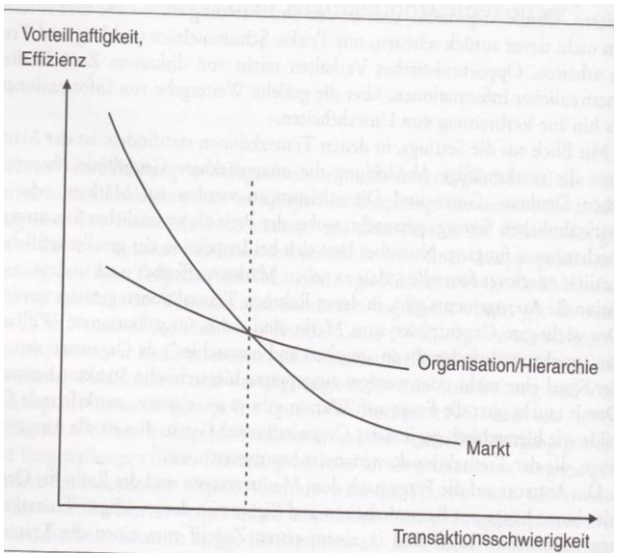
2 Price information and market efficiency

This may sound as if I wished to escape the central question of this conference and revive either the primitivist position of embedded exchange, or the model of the controlled economy associated with the work of Claire Préaux and others.[8] But this is not the case. I rather wish to raise the question which factors we need to consider if we explore market efficiency in antiquity, and whether the price information we have provides good indicators for such efficiency. Neo-institutional economics has helped us to think about market efficiency not just in terms of the supply and demand mechanism (equilibrium theory), but in terms of the conditions which encourage market-oriented production and consumption. These conditions are construed in relation to (a) transaction costs, (b) the institutions which encourage and constrain transactions, and (c) the organizational settings which provide alternatives to market exchange. The most relevant *transaction costs* are, according to Ronald Coase, ex-ante costs (finding the right commodity for the best price and of the best quality), security costs (identifying a trustworthy partner and ascertaining that the commodity offered has the right quality), and ex-post costs related to the execution of the agreement or contract.[9] *Institutions* are those rules of behavior and legal contexts in which transactions take place (most importantly property rights, contractual law, monetary instruments; but also soft factors such as norms and morality*). Organizational settings* which constitute an alternative to the market may be firms (and by implication agrarian estates), households, and 'state' (royal/imperial) economies which in contrast to markets tend to have asymmetrical governance structures.[10] According to O. E. Williamson, the attraction of markets – and thus their efficiency as distribution mechanism controlled by supply and demand - decreases in relation to the complexity of the exchange.[11] Simple transactions are more suitable to markets than those which are complicated. The complexity of a transaction is largely an institutional variable, depending only to some extent on the intrinsic nature of the transaction. It depends more heavily on transaction costs depending on institutional contexts (law, money, property rights, norms) and the frequency in which transactions are made (again a factor of institutional context: even a difficult transaction becomes less complex, if it happens frequently). Thus

[8] Préaux (1939); Manning (2010), 11 ff. for most recent discussion.
[9] Coase (1937).
[10] Preisendörfer (2005) for a useful introduction (in German).
[11] Williamson (1975); cf. (1996)

transactions become less complex, and more suitable for markets, if (a) the institutional context facilitates exchange, and (b) the institutional context increases the frequency of transactions.

Williamson's second observation is that the efficiency curve of hierarchical organizations (which pose an alternative to market exchange) decreases less sharply in relation to the complexity of exchange.



(from Preisendörfer, P. Organisationssoziologie. Wiesbaden 2005, fig. 3.1)

From a certain complexity of a transaction onwards (the crossing of the dotted line) organizational settings rather than the market become more favourable to the transacting partners and thus more efficient. It is an obvious corollary of this model, but worth stating, that a market setting may be the most efficient in relation to one commodity (say, Arabian spices), while less so in case of another (say, monetary loans). Thus we cannot talk about market efficiency as such, but market efficiency in relation to specific commodities. Thus also we have to distinguish between social groups who are at an institutional advantage (because of their superior access to e.g. money, law and bargaining skills) and thereby reducing the complexity and costs of the portfolio of their transactions.

It is well known to all present at this conference that social forms of material exchange formed a viable alternative to anonymous market exchange throughout the societies of the

Mediterranean basin: loans were extended among friends and those included into this category for various ideological reasons; produce was exchanged among neighbours, relatives, and friends; foreign products travelled along guest-friendship lines; goods and services of collective significance were supplied or subsidized by wealthy members of a community, and so on. In addition, we can observe in Greco-Roman Egypt that large agrarian estates, as well as Egyptian temple estates, offered ample opportunities for the transaction of food, money and labour between employer and employee, or between the employees themselves.[12] Other such contexts were local administrative offices and the military where commodities and services circulated as part of the payment structure, or as by-product of the social and ethnic ties that were present in, or formed by, them. I do not think that in the space of this paper this needs any more illustration. We need to think about the question, whether these social contexts of exchange can be called 'organizational', and how they competed and overlapped with forms of market exchange.

Among 'organizations' I would like to include not only the structures of large estates, but also of those which most scholars would refer to as the 'state'. In the case of Hellenistic 'states' they should rather be termed royal economies. They differed from markets in so far as transactions were characterized by hierarchical governance structures. They differed from modern states in so far as they lacked the bureaucracy and power modern states are expected to exert over their economies and people. The royal economy included local administration offices and the military which provided not only an organizational context with hierarchical governance structures but also opportunities for exchange. In the case of large agricultural gift-estates (the Zenon estate being the major source of information here) royal and 'private' economy overlapped considerably, as these estates fulfilled fiscal tasks, produced agricultural surplus for the benefit of the royal economy, and in turn took advantage of the administrative, legal and personal infrastructure of it.

One difficulty, however, results from the fact that the contrast between markets and hierarchical organizations does not map easily on historical or even contemporary reality (a problem that Williamson himself identified).[13] Throughout history there are always hybrid settings which blur the boundary between market and organization. People in organizations subcontract work and buy supplies in the market, while markets are never entirely anonymous and egalitarian. As you will see in a moment, it is just this hybridity of markets and

[12] The classic account is that of Rathbone (1991); for Ptolemaic Egypt Reekmans (1966) (1996) and von Reden (2007 a) for Ptolemaic Egypt.
[13] Preisendörfer (2005), 47.

organizations which challenges the neo-classical model of price-formation as indicator of market integration and efficiency. In the case of Ptolemaic Egypt, the mutual interference of markets and transactions related to organizational settings (characterized by hierarchical governance structures) was particularly intense.

3 Market model and the model of the bazaar

In a number of recent publications the historian of the Roman economy Peter Bang has challenged our current models of the market, asking whether the early modern European concept is suited best for understanding the market of the Roman Empire.[14] He argues that we are misled if we conceptualize ancient Mediterranean economies within or against the models developed in the course of the emerging nation state. The Roman state and its economy were far more comparable to the structures of other tributary empires such as early modern China, the Ottoman Empire or Moghul India. In contrast to European nation states, these empires were imperial monarchies almost unchallenged by economic interstate competition. Moreover, rather than establishing systems of taxation, or the kind of commercial protectionism on which early modern states thrived, they remained largely decentralized systems relying on the predatory strategies of local elites and governors. They had weak state apparatuses and inefficient administrations. The emperors were set on maximizing tribute as well as exploiting agrarian and mineral resources, but they were incapable of effective central control. This was not the context in which liberal markets regulated by the 'invisible hand' and the 'price-mechanism' could emerge. However, a certain type of market developed under such imperial conditions nevertheless, since some such exchange mechanism was crucial for converting local resources into fiscal capital and the products which local elites and governors wished to consume. These markets, however, functioned differently than the liberal market. Bang uses for the ancient market the model of the Afro-Asian bazaar in which so-called clientelization – a term borrowed from Clifford Geertz – is the principal road to success (and thus their efficiency). Insecurity, unpredictability and lack of information – in short, everything that produces costs and complexity in a free market - are compensated for by social networks and clienteles who generate the degree of security and information that is necessary to make a market transaction successful. In other words, bazaars do not work on the basis of legal security, administrative control and economic integration, but on the basis of

[14] Bang (2002); Bang (2007); (2008).

social networks that exist outside the market. In contrast to the social models of the market that the anthropological literature of the 60s and 70s of the 20th century produced, Bang's model explains how clientelization rendered markets efficient mechanisms of exchange related to particular political systems rather than posing an opposition between the market as social site and economic efficiency.

A second aspect of imperial tributary economy is the emergence of particular economic roles which are unfamiliar to the European market model. Bang writes:

> Understanding the link between the extraction of agricultural revenues and commercial activities in agrarian empires has been a main concern of historians of seventeenth- and eighteenth-century India. They describe it as 'portfolio capitalism']. The concept is a development of Weber's notion of political capitalism originally based on Roman examples...The notion of portfolio capitalism draws attention to the need for revenue-extracting groups to avail themselves of commercial services and credit operations in order to mobilize the agricultural surplus. Intensified collection of rent and tribute generates development of merchant and banking groups in the economy. Furthermore, aristocratic households will also seek to gain direct access to the world of commercial and credit services by diversifying their economic activities – their 'portfolios' – in order to expand the range of resources they command. Frequently they will attempt to complement agricultural revenues with involvement in state contracts, revenue collection and prosperous luxury trades so as to increase the share of disposable resources available to them in the form of liquid wealth.[15]

The significance of Bang's considerations lies, first of all, in the observation that market efficiency cannot be related to the perfect liberal market model alone. The bazaar economies of the Asian empires during the early modern period, according to Bang, could easily compete with the market economies of Europe. In connection with the Williamson theorem, moreover, the principles of the bazaar economy can be brought to bear on the question of how problems of complexity can be solved within markets which do not approach the perfect conditions of the liberal market model. The bazaar seems to be a typically hybrid setting in which

[15] Bang (2007), 33 f. with Subrahmanyam & Bayly (1988) and Weber (1924).

hierarchical structures interact with the egalitarian ones imagined for the perfect (liberal) market.

Can networks of friendship and clienteles be called 'organizations' in the neo-institutional sense? The fundamental contrast between markets and organizations is the question of governance structures and time. Market transactions are, according to Williamson, 'spot-transactions', while the transactions of organizations are typically hierarchical and predicated on prior social and economic relationships. These relationships result in possibilities for advance and delayed payments, exchange of information, and the provision of trust and morality. The type of networks that did offer such opportunities in antiquity, were typically hierarchically organized, were based on long-term relationships and had social as well as economic functions. I think, therefore, that we can regard ancient networks of friendship and clienteles as organizations.

The notion of portfolio capitalism draws attention to the degree to which capitalist behaviour and economic efficiency should not be regarded as just a question of the integration and competition of liberal markets. An efficient system of transactions, rather, becomes a function of the question of how mach markets are integrated into the fiscal and tributary structure of the imperial (hierarchical) system of the tributary state. The portfolio capitalist combines the profitability of commercial and fiscal engagements. The notorious tax-farming companies, but also money-lenders and 'entrepreneurs' speculating in rents and taxes are the best examples of portfolio capitalists.

4 Economic development under the Ptolemies.

With this in mind, we can turn to the Ptolemaic economy. Arguably, there was some growth in the Egyptian economy under the Ptolemies from c. 320 to c. 220 BC. The question of how this growth can be quantified and how it compared to the periods before and thereafter would require another paper. Here I want to give some of the arguments which can be brought forward in favour of economic growth. They are neither difficult to establish nor particularly controversial among scholars of the Ptolemaic economy.[16]

[16] Von Reden (2007 b)

(1) The growth of the city of Alexandria: Between c. 320 and 200 BC the city of Alexandria developed into a metropolis of some 500,000 inhabitants.[17] According to Walter Scheidel, urban population growth happens only if it is combined with an increase in standards of living. [18]Urban populations contract quickly if they are exposed to poor living conditions such as poor food supply, lack of hygiene, and thus disease. It might be significant that, while we hear of a food shortage in Alexandria under the satrap Kleomenes of Naukratis in the 330s, we do not hear of any such instance until well into the second century BC.

(2) The growth of the Ptolemaic court: From 320 BC onwards, the Ptolemies established a highly expensive court composed mostly of an economically unproductive intellectual and military élite. This court may have been financed partly by the capture of treasury in conquered lands, as well as exploitative taxation. But – as Bang's model suggests – military and fiscal booty must be converted into capital for consumption and military re-investment, and thus requires a functioning market system. In turn, the Ptolemaic court with its strong focus on learning and intellectual exchange demonstrates that the Ptolemies had, and used, the opportunity to invest in human capital and knowledge, which according to the neo-institutional model is a factor stimulating further economic growth.

(3) Egyptian temple construction: Egyptian temples saw a prosperous period under the Ptolemies. This began in the middle of the third century with the enormous building project of the Horus temple at Edfu and continued with a series of major works and restoration projects during the second century. Both Alexandrian literature and Egyptian temple inscriptions make abundantly clear that the intense building activities under the Ptolemies were financed by the kings and their *suntaxeis* to the Egyptian temples.[19]

(4) The Ptolemaic monetary system: Egypt had notoriously poor mineral resources. There were no silver mines, and bronze was derived mostly from the island of Cyprus which the Ptolemies controlled during most of the years between 320 and 200 BC. Again it might be arguable that the fantastic monetary wealth of the Ptolemies was simply looted. But the famous letter instructing Alexandrian bankers how to exchange foreign coins into Ptolemaic ones (which were lighter than the current Alexander staters)

[17] Rathbone (1990)
[18] Scheidel (2007)
[19] Huss (1994); Manning (2003).

suggests that part of the silver money that the Ptolemies controlled came into Egypt through circulation (P. Cair. Zen I 59021, 259/8 BC).[20]

(5) Grain export: Several factors suggest that the part of the Ptolemaic silver coming into Alexandria by way of circulation was considerable: The largest amount of amphora handles dated to the Hellenistic period relates to trade between Alexandria and Rhodes (80,000 of a total of c. 100,000 known during the time of Gabrielsen's discussion in 1997).[21] There are also several indications that the largest amount of grain passing through the harbour of Rhodes in the third century was Ptolemaic.[22] The annual volume of the harbour taxes of Rhodes, in turn, was probably more than four times higher than that of Athens in the fifth century, which had been high by contemporary standards. Finally, Ptolemaic prosperity and power declined during the second century BC. One important factor for this decline must have been the result of the loss of the Ptolemaic provinces of Syria Palestine and Cyrene to the Seleucids and Ptolemaic internal rivals respectively. Palestine and Cyrene, like Egypt produced a large surplus in grain which seems to have been traded into the Mediterranean via Alexandria rather than directly from, and for the benefit of, these provinces. In 270/69 BC, for example, the Pithom canal was restored, linking the Nile Delta via Pithom with the Red Sea at the border between Egypt and Syria Palestine.

(6) Improvement of agrarian production and economic infrastructure: Ptolemy II developed the Fayum oasis as an area of military and civilian settlement between 265 and 250 BC. The area was a centre of agrarian production and export, serving both as agrarian hinterland for city of Alexandria and its export market. In the Fayum, moreover, there was also much export and import of goods from and to the Asian continent. This is suggested not just by occasional hint in the Zenon archive, but more so by the development of harbours and desert routes from and to the coast of the Red Sea.[23] Several harbours were founded during the 60s and 50s between the Pithom canal and the strait of Bab-el Mandeb, such as Arsinoe, Myos Hormos, Philoteras, and Leukos Limen (linking the Nile and the Red Sea at their shortest distance). Berenike Trogodytike was the terminal point of a caravan route that Ptolemy II had established through the Eastern desert down to Koptos in Upper Egypt. Thus other parts of Egypt

[20] Von Reden (2007 a), 43-48 for recent discussion and literature
[21] Gabrielsen (1997), 64-69.
[22] Ibid.
[23] Bayer-Rothoff (1993); Rostovtzeff (1932); von Reden (2007 a), 24-26.

about which we are less well informed than about the Fayum benefitted from the improvement of infrastructures as well.

Given these multiple indications of increase in economic production, consumption and infrastructure, it is surprising that market exchange proper plays such a subordinate role in our evidence. Partly this is an accident of our papyrological material that tends to come from organizational contexts such as large estates, the military, and local administrations. There are, moreover, no papyri from Alexandria where most of the agrarian surplus of the Ptolemaic economy must have been marketed, consumed, and traded. But given the vital importance of the Fayum in the Ptolemaic effort to increase agrarian production, and for the provision of the city of Alexandria with goods for consumption and export, it is noteworthy that in the Fayum, too, there is so little evidence for market exchange proper. It seems to be not just an accident of the evidence that the vast majority of our grain prices are not related to what we would call spot-transactions.

5 The context of sale and the evidence of prices in Ptolemaic Egypt.

In order to illustrate the degree to which the Ptolemaic economy conforms to the model of the bazaar economy rather than to that of the liberal market, I need to turn to some examples of Ptolemaic economic practice. I confine myself to three of them:

a) Business networks in the Fayum

P. Köln VIII 346 (2nd half 3rd c. BC) illustrates the complex activities of a travelling agent working within a network of people. The papyrus contains a monthly account of income and expenditure over a period of four months drawn up for a superior or partner who is addressed in the second person. The writer, not known to us by name, dealt in commercial matters in the Arsinoite nome, making payments, buying animals, compensating for theft on transport, receiving payments for grain, and making payments on behalf of others, perhaps fellow agents or partners. His journeys took him to places in all parts of the nome as well as to the metropolis Krokodilopolis. The person to whom he renders account was probably a public official since he had authority over some Egyptian soldiers, one of whom accompanied the

writer on his journeys, and another who receives payments from him. I think we can call the context in which his business operated a hybrid form of hierarchical organization and market. The sums involved are moderate, and it is the complexity of the transactions rather than their value that calls for attention. None of the expenditure is a direct payment for a commodity purchased or sold. It is most likely that the agent was in charge of collecting cash and making payments only, while others dealt with the delivery and collection of the goods involved. Moreover, few of his transactions were made in a market place. Only two of the payments are related to retailers who may have had their stalls in the market, while all others take place in the houses of individuals, on farms or in workshops. It seems almost certain that in general the agent had regular contact with his clients, rather than dealing anonymously with them or in the form of isolated one-off transactions. All retailers seem to have kept records of the transactions they had made with him. The account, indeed, might not reflect much commercial business at all, but rather the dealings resulting from the provision and distribution of goods related to of a larger household or administrative office. However, although the writer seems to be in charge of the finances of his addressee, their financial activities are strictly separated. There is thus some reason to suppose that he was some middleman or agent who made transactions at his own financial risk.

The writer of the account, moreover, seems to have been part of some network of dependents and clients. It is fairly certain that Nechthepheros (one of the soldiers) accompanied the agent on his journeys and received several amounts of money, one time specified as being for his personal 'needs' or 'duties', or simply as a loan (*chreian*). Even if *chreian* is to be translated as 'loan', it is likely to have been designed for payments and purchases made on order of the writer of the account; and Nechthepheros had to render account to him too. Another person who appears more than once as recipient of money is a certain Alexandros, son of Bakchios. He must have been a superior to the agent since he is in a position to give him instructions, as well as to others concerned with the business. Given that Alexandros' mother, Bakchios' wife, is one of those from whom the addressee of the account had taken a loan, it is likely that they were friends or business partners.

b) Portfolio capitalism in Tholthis

In a number of late 3rd-century tenancy agreements from Tholthis and Takona in the Oxyrhynchite nome, Jean Bingen has shown that the prepayment of rent (*prodoma*) stipulated

in these contracts had a special commercial meaning.[24] The lessees were typically *epigonoi*, that is, second-generation immigrants who were not holders of royal or cleruchic land. The lessors, by contrast, describe themselves as cleruchs not yet registered in the army (*idiôtai* or *oupô huph' hegemona).* The *epigonoi* seem to have been the stronger parties of the transaction, as the conditions of the agreements tended to be to their advantage (interest rates were hidden and thus potentially above the official maximum). The lessees prepaid part or all of the rent at the beginning of the rental period and set it off against the rental obligation due after the harvest. The interest was included in the sum of the prepayment, so it bypassed legal control. Moreover, it does not seem that the lessees cultivated the land themselves, but sublet it to others.

Prepayment of rents both in cash and in kind was part of a financial strategy. In P. Hamb. II 188 (218 BC) a certain Aristolochos, son of Stratios, pays a *prodoma* of 150 artabas of wheat to a certain Theophilos, a holder of a 30-aroura plot. This was repayable against the rent of the two following years, as stipulated in a separate contract. The amount of interest that was included in the repayment of the loan (the rent) could remain unspecified, but the penalty clauses suggest the possibility that it was staggering in comparison to that of other loans. Aristolochos is well known from further three documents belonging to the Tholthis series: In BGU VI 1268 (end 3rd c. BC) he leases the land of a certain Hipponikos for two years at a total rent of 250 artabas of wheat plus green crop. In the receipt of P. Hamb II 189 (216/5 BC) he appears together with a certain Straton, at this time *triakontarouros*, but later describing himself as *epigonos*, as payer of a *prodoma* of 150 artabas against the rent for two years. A few months later he provides another loan together with leasing a *klêros* from the borrower. Bingen observes that the lease was agreed in February, several months before the ordinary time of lease contracts. At this time the land was still cultivated by the previous tenant, so the loan was given on security of a tenancy starting in the future. In BGU VI 1265 (year 9), Aristolochos appears again together with Straton as the lender of 100 *artabas* agreed in the form of a prepayment of rent, this time due to a certain Merinodes. The number of Aristolochos' engagements makes him a particularly good case of a professional middleman leasing and subleasing cleruchic land and making loans at a profit.

This and others of Bingen's papers were path-breaking within the scholarship of Ptolemaic Egpyt. They demonstrated how profit-oriented business was part of an economy which so far had been described as 'planned' and 'controlled'. Bingen showed that in the context of the

[24] Bingen (1978).

cultivation of cleruchic land, but also in relation to the Ptolemaic tax-farming system, there developed the role of the Greek 'entrepreneur'. These entrepreneurs were usually second-generation or civil immigrants with no entitlement to landed property, but with good social connections to the cleruchic Greeks. These landless immigrants made most of the money economy of the Ptolemaic regime and introduced into the Egyptian economy a capitalist element. Against the background of Bang's model, however, we can delineate the economic role of the Ptolemaic entrepreneur more sharply. It emerged not so much within the rationality of a liberal market economy (related to the introduction of coinage), but rather within the fiscal economy of a tributary empire.

c) Market vs organization – equality vs hierarchy in the Zenon archive

The Zenon archive (3rd c. BC) provides abundant evidence for the internal transaction of food and other goods to permanent staff and temporary employees on a large gift estate.[25] In the form of grain rations such transactions were adapted from a traditional Egyptian system of food redistribution. In the form of wine and other produce of the estate, such as cheese, wool, milk or green crop, they were set off against monetary wages and salaries; the conversion rates were variable. The advantages of being a member of a large agrarian and administrative organization extended to the provision of credit (at normal interest rates or interest-free), the provision of labour (in the case of slaves wages were to be paid to the owner or the slave directly), and the provision of resources such as building materials and transport animals. A third variant of this internal system of provisioning was the so-called *himatismos* – an annual clothing allowance paid in cash. Grain rations, conversion of salary and clothing allowances can be regarded as typical transactions taking place in organizational settings. These transactions, taking place within hierarchical structures and being embedded in a long-term social and economic relationship, withdrew a considerable amount of supply and demand from the sphere of the market, and thus competed with it economically.
Employees and tenants, however, had the choice of taking advantage of the organizational system of provision, or use an alternative one. The choice was made on the basis of what was most favourable, that is, least costly to each of the parties. Unpredictable or higher prices in the market for food were probably the costs the payee held against the greater dependence resulting from the hierarchical structures of an organizational provisioning system. A well-

[25] Orrieux (1983); von Reden (2007 a).

attested problem of organizational provisioning in Ptolemaic Egypt was, by contrast, that the boss did not deliver the ration or the money he had promised t furnish (thus over-using the hierarchical structure of the transaction). From a defaulting paymaster costs could accrue to the payee, especially if the latter used the provisions to pay his own work force. This happened if the payee was a middleman who had contracted work from his master, or had rented his land and equipment to run his own business. For the boss or estate manager, the offer of low-cost provisions reduced his personal income, but increased the vertical integration of his business and thus the degree to which he could control his dependents. To balance integration, dependence, risk and economic costs is the usual task of rational agency in a market economy too; but in a non-market 'bazaar' or 'tributary' economy, it is likely that these factors were balanced differently against each other.

One document in the Zenon archive might be instructive in this context. P. Cair. Zen. IV 59649 (mid 3rd c. BC) contains various proposals for a rental agreement of a boat belonging to Zenon. The boat was used for transport of goods and people on the river Nile between its harbours. The captain was probably not a trader but a ferryman charging a fare for the trips booked by third parties. Zenon suggests to the captain that he would either pay 7 ½ dr per month to each sailor of the crew, or to split their monthly salary into 6 dr and 1 ½ artabas (c. 60 l) of grain. The captain was to receive 10 dr and the same amount of *sitometria.* The advantage of splitting the payment lay in the fact that 1 artaba of flour was reckoned at 1 dr, which was below the iconic/typical/normal grain price of 2 dr per artaba. 60 l were probably more than sufficient for nutrition and included the possibility to sell the surplus, or to exchange it for other supplies. The captain in turn suggests four alternatives. First he states the monetary costs of the enterprise: government tax of 292 ½ dr and a monthly salary of 7 ½ dr to each of three sailor as well as 10 dr monthly to him (325 dr in total). According to suggestion A, Zenon would pay all wages as well as taxes, and get the profit from the business of the boat. In an alternative proposal (B), he would pay wages of 6 dr plus 1 ½ artabas of *sitometria* to each sailor, as well as 8 drachmas plus the same amount of *sitometria* to the captain. Zenon would pay the government tax and receive all profits. In suggestion C, the captain will pay a rent of 500 dr, the wages to the sailors and receives all profits, while Zenon pays the government tax; and if Zenon uses the boat, rent and wage payments will be reduced proportionally. In suggestion D, the captain pays the tax and wages, but no rent, while Zenon provides *sitometria* for captain and sailors, as well as being entitled to use the boat whenever he wishes at his own profit.

In proposal A and B the captain would be a direct employee of Zenon's, while in proposal C and D he would rent the boat as a tenant. Proposal A and B differ only in so far as in one case Zenon would compensate the monetary wage payment with *sitometria* from the estate. Proposal C and D differ in so far as in proposal C the monetary costs for the captain (rent and wage payments) are fixed, while he runs the shipping business independently, even for the time when Zenon uses the boat. In proposal D he still suggests a kind of rental contract, but with a greater degree of interference from the owner of the boat. The four proposals suggest each a different mixture of egalitarian (contractual) and hierarchical (organizational) transactions. Each have their own advantage for the contracting parties, but it is apparent, that the greater degree of dependence of the captain comes with the *sitometria* payments. They are not just a variable in a financial calculation.

7 Conclusion: gain prices in a bazaar-type economy

The examples I have given in the previous section suggest that the economy of the Greeks in Ptolemaic Egypt show some similarities with the model of a bazaar economy suggested by Bang. If this is accepted, we can see that grain prices did not develop in a free (liberal) market setting, but in a mixture of organizational and market settings which must have had important effects on the level of prices and their stability in Ptolemaic Egypt.

1. Grain prices did not form according to any supply-and-demand mechanism
2. They were seriously affected by conventional prices that were used in organizational types of transaction such as conversions of monetary payments, *sitometria,* and official conversion rates applied in public and private contracts.
3. These stayed relatively even over a long period of time despite the fact that this time also saw a greater degree of commercial activity as a result of economic growth.
4. The fact that these organizational forms of transaction remained attractive, and at the same time did not prohibit trade and exchange, can be explained within the neo-institutional approach. This approach proposes an efficient balancing of organizational and market-types of exchange as most favourable to the economic process, rather than the greatest degree of market efficiency in the neo-classical sense.
5. The nature of the most efficient balance between hierarchical and egalitarian (liberal) forms of exchange depends on the institutional context of the economic process. In a

> society of comparatively little contractual security in the market, little centralized control over the value of the currency, little centralized control over law and order in local markets, and probably also a great fungibility of grain, organizational forms of grain distribution were highly advantageous to economic agents at all social levels, and thus the economy as a whole.

Points for discussion resulting from this paper may be (a) whether the social relationships which I take to represent 'organizational settings' are correctly identified as such, and (b) whether the relatively heavy theoretical frame I brought along is helpful for understanding prices and economic development in Ptolemaic Egypt.

Bibliography

Bagnall, R. (1999) Review of Cadell and Le Rider (1997) *SNR* 78: 97-103.

Baker,H./Jursa, M. (forthcoming) Proceedings of a conference held in Vienna July 2009.

Bang, P. (2002)‘Romans and Mughals – economic integration in a tributary empire‘ in de Blois, L./Rich, J. The Transformation of Economic Life under the Roman Empire. Amsterdam, 1-25.

(2007) ‚Trade and Empire – In serach of organising Concepts fort he Roman Economy‘ P&P 195, 3-54.

(2008) The Roman Bazaar. Cambridge.

Bayer-Rothoff (1993) Untersuchungen zur Aussenpolitik Ptolemaios’ III. Bonn.

Bingen, J. (1978) ‘The third-century land leases from Tholthis’ *ICS* 3: 74-80.

Cadell, H./Le Rider, G. (1997) Prix du Blé et Numéraire dans l’Égypte Lagide de 305-173. Brussels.

Coase, R. (1937) ‚The nature of the firm‘ Economica 4, 386-405.

Gabrielsen, V. (1997) The Naval Aristocracy of Hellenistic Rhodes. Aarhus.

Huss, W. (1995) Der makedonische König und die ägyptischen Priester. Studien zur Geschichte des ptolemäischen Ägypten. Stuttgart.

Huston, S.M./Lorber, C. (2001)) ‘A hoard of Ptolemaic bronze coins in commerce, October 1992 (CH 8, 413)’ NC 161: 11-40.

Manning (2003) Land and Power in Ptolemaic Egypt. Cambridge.

(2005) ‘The relationship of evidence and models in the Ptolemaic economy’ in Manning,J./Morris, I (eds). The Ancient Economy. Evidence and Models. Stanford, 187-206.

(2010) The Last Pharaohs. Egypt under the Ptolemies, 305-30 BC. Princeton

Maresch, K. (1996) Bronze und Silber. Papyrologische Beiträge zur Geschichte der Währung im ptolemäischen und römischen Ägypten bis zum 2. Jahrhundert n. Chr. Papyrologia Coloniensia XXV. Cologne.

Orrieux, Cl. (1993) L’archive de Zenon: l’horizon d’un Grèc en Égypte au IIIe siècle avant J.-C. Paris.

Préaux, Cl. (1939) L'Économie Royal des Lagides. Brussels
Preisendörfer, P. (2005) Organisationssoziologie. Grundlagen, Theorien, Problemstellungen. Wiesbaden 2005.

Preisigke, F. (1910) Girowesen im griechischen Ägypten enthaltend Korngiro, Geldgiro, Girobanknotariat mit Eibschluss des Archivwesens. Ein Beitrag zur Geschichte des Verwaltungswesens im Altertum. Strassburg.

Rathbone, D. (1990) 'Villages, land and population in Graeco-Roman Egypt' PCPS 216 n.s. 36: 103-142.

(1991) Economic Rationalism and Rural Society in Third-Century AD Egypt. The Heroninus Archive and the Appianus Estate. Cambridge.

Reekmans, T. (1948) 'Monetary history and the dating of Ptolemaic Papyri' Stud.Hell. 5: 15-43.

(1966) La sitométrie dans les archives de Zénon. Pap. Brux. 3. Brussels.

(1996) La consomation après les archives de Zénon. Pap. Brux. 27. Brussels

Rostovtzeff, M. (1932) 'Foreign Commerce of Ptolemaic Egypt.' Journal of Economic and Business History 4: 728-69.

Scheidel, W. (2007) 'Demography' in Morris, I./Saller, R./Scheidel, W. The Cambridge Economic History oft he Greco-Roman World. Cambridge, 38-86.

Subrahmanyam, S./Bayly,C.A. (1988) ‚Portfolio capitalist and the political economy of early modern India' Indian Economic and Social History Review 25.4.

von Reden, C. (2007 a) Wirtschaftliches Wachstum und Institutioneller Wandel' in Weber, G. (ed.) Kulturgeschichte des Hellenismus. Stuttgart 2007, 177-201.

(2007 b) Money in Ptolemaic Egypt. Cambridge.

(2010) Money in Classical Antiquity. Cambridge.

Weber, M. (1924) Agrarverhältnisse im Altertum. In ders. Gesammelte Aufsätze. Tübingen.

Williamson, O. E. (1975) Markets and Hierarchies: Analysis and Antitrust Implications. New York.

(1996) The Mechansims of Governance. Oxford.