Appendix I – Notes on Individual Commodities and Indicators

*Wheat*

Wheat, and barley, should in theory show less variability in price at any one time than other commodities such as wine or donkeys given the lack of variations in quality or age.[[1]](#endnote-1) We should also be aware of the impact on prices of features such as farm-gate as opposed to retail prices, time of year of sale and size of purchase when conclusions are reached. There would also have been price differences by region reflecting transportation costs and customs dues (Bransbourg 2012: #73). Seasonal variations can sometimes be discerned, as in *P.Sarap.* 32 when a low price seems to be attested immediately after the harvest (Rathbone 1997: 195). Nevertheless the data have been taken for all commodities at face value and no attempt has been made to adjust the data for perceived seasonal or other variability since the number of available transactions does not permit such an approach and there are no clear statistically valid trends apparent that would justify such adjustments. In determining the sources to be used, Rathbone’s 2014 data for private sales of wheat have been taken as a starting point.[[2]](#endnote-2) Prices contained in penalty clauses have been excluded since these may not represent market prices. One additional case was found, *P.Oxy.* XXII 2351, where the parties to a lease agree an option to pay rent in either cash or wheat and since, in my view, this is an option based approximately on the expected market price rather than a penalty price I believe it is a relevant data point.

*Barley*

Though wheat was the staple element of the diet, other commodities were in daily use including barley. Barley prices would, in principle, have been subject to similar regional, seasonal or other price distortions as those which applied to wheat. Although barley is a similar crop to wheat there were important differences including that its utility for bread making is lower, it was used as hard tack for animals, is more bulky to transport and it has lower nutritional value (Rickman 1980: 5). Figure 2 which shows barley prices in drachmas per *artaba* is based on Rathbone’s 2014 data (Rathbone 2014: Table A8.16). Both private and state sales have been included, but if private sales only were examined the curve would be similar.

*Wine*

The data for wine are those that were given in Rathbone which I have supplemented from papyri mostly published after Rathbone’s paper.[[3]](#endnote-3) The data have been adjusted as described above for median weighting and for sources of uncertain date. The prices are standardised in drachmas per *keramion* *monochoron* or ‘single-size jar’ (Rathbone 1997: 199): Whilst wine is the commodity with one of the largest sets of available price points there is likely to have been price variability which had nothing to do with long-term diachronic change. This variability would include environmental conditions affecting that year’s yield, retail/wholesale price differences, seasonal variations, quality differences and local market conditions. Nevertheless with a sufficient number of observations, despite such short-term variations, the amount of data should still allow a general price/time long-term trend to be determined. An indication of the variability in the data caused by differences in quality can be gauged by Diocletian’s price edict of AD 301 where the price of wine varied from eight to thirty denarii according to age and grade, though the indication that old wine was less expensive than new wine is contradicted to some extent by the evidence from Egyptian estates (Rathbone 1997: 203). Wine was difficult to store for more than a couple of years and the price variations would not have been as extreme as in modern times where large amounts are paid for older vintages. The prices available to us from Roman Egypt also appear to be for locally produced wine rather than imported premium wines which may have commanded a higher price, and this should tend to reduce variations caused by differences in quality. The bulk of the wine data come from the Arsinoite nome and it is worth checking to see if a different pattern would be shown if only Arsinoite sources were considered. The chart for Arsinoite wine only has the same R² coefficient as the all-Egypt data and shows a similar pattern though the period of flatter prices in the first 160 years is more pronounced.

*Donkeys*

As regards donkeys, the latest collection of prices has been collated by Litinas and this, together with Rathbone’s earlier collection, has been used for the analysis here (Rathbone 1997: 234-238; Litinas 2019). I have also added one source which I identified separately: *CPR* XV 48 from the later second century AD. Although donkeys lack the obvious direct linkage to the cost of living that cereals and wine have, they could constitute part of a basket of goods and services that might be used to assess that cost since they were very commonly used as beasts of burden and for general agricultural tasks. Both foal and adult donkeys are included since donkeys mature quickly and foals could also be put to economic use before reaching full maturity. Whilst donkeys lack some of the farmgate/market differentials of goods which are costly to transport, they have greater intrinsic variation through their age, condition and sex. It is difficult to determine any strong trends in this regard though male donkeys may have been preferred to female, and young donkeys to old (Rathbone 1997: 209).

*Donkey rents*

These data are daily rates in drachma and have been derived from the lists compiled by earlier scholars (Drexhage 1991; Johnson 1936).

*Slaves*

There is one other commodity, that is slaves, which could be considered as fitting within a basket of living costs, at least one applicable for prosperous individuals, since their prices were considerably higher than donkeys. Straus’s list of slave sales has been used as the primary data (Straus 2004). These data exclude cases such as *Jur.Pap.* 37 where the slave was purchased outside Egypt. Children under 12 years old have also been excluded since child prices would be likely to be less than an adult given infant mortality risk and their smaller economic utility. I have tested whether an alternative approach, where children between ages five and 12 are assumed to have half the value of a slave over age 12, would result in a different conclusion but the results are very similar. In both cases children of four or younger are ignored. The heterogeneous nature of the data, with the value of slaves being influenced by age, sex, skills, health and character, means that the data points are quite widely dispersed, but the R² coefficient of the curve in the chart is still higher than that for wheat.

*Land prices*

Prices are those for the Oxyrhnchite nome only to reduce any geographical distortions and are prices per aroura for private arable land. If the data for all Egypt were used, then the best-fit line would show a very similar shape but the R² coefficient would be much lower (0.16) which reflects the expected greater heterogeneity of the data from different geographical sites. Note that Harper 2016 relies solely on Drexhage’s data and uses data for all Egypt including confiscated land sold by the state which typically sold at rates well below that of private land.

*Fodder cash rents*

Cash rents per aroura for land under fodder from all nomes in Egypt were used since they seem to follow the same pattern. If only Oxyrhynchite data were used, then the best-fit line would have the same shape but the R² coefficient would have been somewhat lower at 0.16. Harper uses only six data points for cash rents for the period from AD 150 to AD 270 to draw conclusions (Harper 2016: 828-30), relying solely on data from Rowlandson 1996, whereas I have been able to use the thirty sources referenced in the appendix.

*House prices*

House prices for the Arsinoite nome only are used and are normalised to the price for a whole house. Fiduciary sales are excluded as is the atypical *P.Gen.2* 44 from AD 260, which is the purchase of a 1/32nd share of two houses, one with two towers and a court, for in excess of 1,500 drachmas, which equates to a price per house of 24,800 drachmas. However, if *P.Gen.2* 44 were included it would not change the shape of the best-fit line. Increase rates are higher than for other indicators but I would caution against drawing any conclusions as to comparative trends in house prices, given the limited data and distortions which may be caused by heterogeneity of housing stock. The even greater heterogeneity of house prices by nome, city and village means that the data for all Egypt is more widely dispersed although a similar pattern emerges (the R² coefficient for all Egypt is only 0.11 compared to 0.34 for the Arsinoite nome).

*House rents*

The landlord income is expressed as the income provided per whole house, either as the economic benefit provided in the case of an antichretic loan where the tenant provides an interest-free loan to the landlord or the actual cash rent. In assessing the economic benefit to a landlord of an antichretic loan the ‘standard’ 12% interest rate for Roman Egypt is assumed. The data cover all Egypt, but leases for confiscated houses - *P.Marm.r* (AD 190-1) and *SB* XX 14281 (AD 142); outliers with very high rents greater than the typical purchase price - *BGU* XI 2034 (Start 3rd century) and *P.Turner* 37 (AD 270); and a document with a very wide dating - *P.Oxy.* XLIV 3200 (2nd to 3rd century) are excluded.

*Loans*

These loans are the cash amounts known but excluding the top five percentile of loans by size since these outliers would distort the results. Given that there are in excess of 1,000 loans within this database, for reasons of space these are not listed in the appendix but can be found in Kelly 2020. The data for loan sizes are naturally very dispersed since they are the indicator that has the least direct linkage to inflation. In general, average loan sizes would be expected to increase in line with inflation over the very long term, but loan sizes will be influenced by other factors including structural changes in the credit markets (Lerouxel 2016).

*Earnings*

Earnings are based on daily adult male rates for manual ‘unskilled’ labour in obols and the data are derived from the lists compiled by previous scholars (Drexhage 1991; Harper 2016; Johnson 1936).

1. Note that Duncan-Jones suggested that there would have been strong regional variations in prices: Duncan-Jones 1990: 149, but there is no clear evidence for this within the data we have available. [↑](#endnote-ref-1)
2. Rathbone & von Reden 2014: Table A8.15, adding *P.Oxy.* XXII 2351 (AD 112). [↑](#endnote-ref-2)
3. Rathbone 1997: 223-233 adding *SB* XX 14576 (AD 46-7), *SB* XX 14525 (AD 57), *SB* XX 14409 (AD 93-94?), *P.Brem.* 45 (AD 109), *P.Oxy.* LXIV 4436 (AD 176-208?), *P.Bodl.* I 126 (AD 193), *CPR* VII 9 (Start third century?) and *P.Louvre* I 50 (after AD 216).

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