Market efficiency and market integration in Babylonia in the 'Long Sixth Century' BC

Michael Jursa (Vienna)

The first part of this paper presents a survey of the principal characteristics of the Neo-Babylonian economy in the period between the fall of the Assyrian empire (612 BC) and the Babylonian revolts against Xerxes in 484 BC. Herein I draw mostly on Jursa 2010; notes will be kept to a minimum. The second part of the paper addresses the implications of the proposed model for the issue of market efficiency and integration in the sixth century Babylonia and for an understanding of the Babylonian economy in later centuries in general.

Introduction

The economy of Babylonia in the first millennium BC does not differ from that of earlier periods of Mesopotamian history with regard to the fundamental features of economic life. The environmental conditions determined to a large extent the economic activities. Four principal ecological zones can be distinguished: the central alluvial plain, criss-crossed by rivers and irrigation canals, swampy river deltas and generally deeper lying areas with little or no drainage – the reed forests in which hunters, fishers and bird catchers operated –, the steppe bordering on the alluvium – the realm of the shepherds –, and the cities. These zones were exploited in distinctive ways: irrigation agriculture had its place in the plain, hunting and fishing in the marshes, sheep breeding in the plain and the steppe, according to a seasonal rhythm, artisanal production and administration in the city. Agriculture had two leading crops, barley and dates, of potentially more or less equal importance for nutrition, and formed the mainstay of the economy: BC Babylonia was a predominantly agrarian society depending on irrigation agriculture. The most distinctive trait of arable farming consisted in the usage of the seeder plough, an ingenious implement allowing high returns on seed. Cereal farming (producing barley, mostly) was therefore an extensive form of cultivation, economising on scarce resources – water, seed and labour – while making comparatively lavish use of land. On the other hand, date gardening, the second distinctive agrarian regime abundantly attested in this period, implied a far more intensive use of land (and water). Typically, date groves were used also for vegetable gardening, fruit trees and even grain farming. Returns – in comparison to the land used – were higher than in the case of simple arable farming, as were labour requirements.

Within this basic matrix, our period exhibits a certain set of inter-dependent characteristics that cumulatively transforms the nature of the economy in important ways. By the eighth century BC, the climatic anomaly that had contributed substantially to the crisis of the Near Eastern world around the turn of the millennium was passed, the climate grew wetter, the conditions for arable agriculture in the alluvial flood-plain of southern Mesopotamia improved markedly, and the population grew. Furthermore there was a process of increasing urbanisation, larger cities grew over-proportionally in relation to smaller settlements. Economic development was impeded during much of the seventh century by political unrest and war, but after the rise of the Neo-Babylonian empire at the end of the seventh century, Babylonia could reap the benefits of peace, and, importantly, of empire, as it had become the centre of a state spanning from the Levant in the West to the foothills of the Iranian plateau in the east. The economy gained considerable impetus from this felicitous combination of ecological, demographic, socio-economic and political factors. During the roughly 140 years following the fall of Assyria and the rise of Babylon, we witness not only an increase of agrarian productivity; it is also evident that agriculture was frequently not aimed at subsistence production but was market-oriented. A substantial (but unquantifiable) part of the urban population worked in non-agrarian occupations, and there was a high degree of labour specialisation. For the first time in Mesopotamian history, it is demonstrably the case that a substantial part of the urban and rural work-force consisted, not of compelled labourers, but of free hirelings who were paid money wages. The economy was monetised to a greater degree than ever before in Mesopotamian history. Not only do the sources furnish richer quantifiable data on prices and wages than in any earlier period of Mesopotamian history, it is also for the first time that these price and wage data can be fully contextualised. Especially among the urban population, few can have remained entirely untouched by the monetary economy. Finally, the available indications for

consumption patterns point to a higher level of prosperity in comparison to earlier periods of Babylonian history.

The overall development of the Babylonian economy in the 'long sixth century' is best described, and explained, by reference to what might be called a 'commercialisation model.'[1] In essence, the model sees population growth as a stimulus for commercial development and technological progress; rising demand generates positive feedback in the economy which offsets (for a while) the Malthusian threat accompanying demographic growth. Urbanisation allows an increasing division of labour and economic specialisation, and thus leads to higher productivity. As administrative, religious and economic centres, cities are foci of high consumption and depend on an increasing pool of non-agricultural labour. They stimulate the production of a growing agricultural surplus through offering market opportunities. Patterns of agrarian development can thus be explained: following von Thünen and his *Agrarkreise* model, proximity to a city and its consumers should cause commercialisation and intensification of agricultural production, whereas agrarian regimes aiming at self-sufficiency of producers and characterised by extensive production are more common as distance from the urban centre increases. This approach allows us to establish a causal link between agricultural development and economic phenomena, especially commerce, which the city-oriented documentation allows us to observe in an urban setting only.

According to the model, the interplay of intensification and market-orientation of agricultural production, urbanisation, increasing division of labour and technological improvements should lead to an increased productivity per capita and thus to intensive economic growth. This implies in theory an increase in real incomes and hence in economic 'well-being' throughout society. It also implies that of the three principal modes of economic exchange, the commercial mode of exchange should play an (increasingly) important role in comparison to the redistributive mode and perhaps also of the reciprocal mode of exchange.

For testing the commercialisation model against the evidence from our period, I have compiled the following list of phenomena that should ideally be observable in the record if the model is a useful guide to explaining the sixth-century economy (Jursa 2010, 785).

(1) demographic growth and increasing urbanisation;

(2) in the rural hinterland of the cities, agrarian expansion in terms of extension of the cultivated area, but also an intensification of agrarian production with clear local foci (owing to urban demand) and local and perhaps even regional specialisation of agriculture as well as cash-crop production;

(3) distinct monetisation of economic exchange in the cities and in the countryside and the availability of credit for productive purposes;

(4) the presence of markets and of an infrastructure allowing efficient marketing of agrarian surplus production; this includes a reasonably efficient transport system, but also a framework of legal and social institutions which are conducive to furthering commercial activities;

(5) individual subsistence strategies, in particular in an urban setting, which do not presuppose an important involvement in agricultural production, and households (both private and institutional) which are not geared structurally towards the ideal of (agrarian) self-sufficiency;

(6) a marked division of labour and non-agrarian labour specialisation; an important role for hired labour (these points are partly corollaries of (2) and (5)).

In addition, going beyond the scope of a traditional commercialisation model, we propose:

(7) a role for the state as an important catalyst sustaining the process of agrarian change, monetisation and commercialisation of economic life by directing (some of) the 'benefits of empire' into the economy (this is in part a variant of (4)).

Here, we will not go through these points one by one; we will focus instead on (3) and in particular (4), which are the decisive issues in the context of the present conference.

The use of silver and the increasing monetisation of economic exchange

Note: 1 Babylonian shekel = 8.3 g.

1 *kurru* = 180 l = 144 kg (dates), 111.6 kg (barley), 99 kg (sesame)

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[1] For variants of this basic model that have been applied to Ancient and Medieval economies see, e.g., Hatcher and Bailey 2001: 121ff., Hopkins 1978, and Millett 2001. For its application to the present period, see Jursa 2010: 783ff.

Exchange in sixth century Babylonia was monetised to a significant degree.[2] The most common money medium was silver, which was weighed and came in certain forms and in specified degrees of purity. Analysing its use, it is necessary to distinguish the institutional sector of the economy, the 'world' of the large temple households, and the private sector of the economy: not because these two sectors of the economy don't intersect, but because the form of the data differ structurally.

In comparison with the eighth-century data, the sixth-century temple archives (of the Ebabbar and the Eanna temples) show that the range of economic situations in which silver money was used had expanded substantially. Silver was the near-exclusive means of payment for all transactions reaching beyond the confines of the temple households. Owing primarily to the importance of cash-crop agriculture (the principal source of the temple's money income) and of hired labour which was paid for in silver, the temples could not have functioned without monetised exchange with the outside economy. The fact that the temples' exchange with the external economy was largely monetised implies that the role of silver money in this external economy, which is documented more sketchily in the private archives, was equally important.

The redistributive household model postulates that temple-internal transactions were generally conducted in kind. However, up to a fifth of the internal payments attested in the archives were in fact made in cash. Monthly salaries (or 'rations') that were normally paid in kind to temple dependants were frequently substituted by silver payments, and we find also frequent instances of money use in the prebendary economy, where the incomes of priests could be paid in silver rather than in kind, as was traditional. Also 'travel rations' – distributions intended for provisioning temple dependents while away from home – routinely contained a silver component[3] points in the same direction: it was common to conduct low-value transactions with silver.

The importance of silver-based transactions for the non-institutional sector of the economy emerges also from the private archives of city dwellers (Jursa 2010, 624ff.). Silver was a common means of hoarding wealth (for those who had any wealth to hoard). It appears frequently in dowry lists and estate divisions, but staples do not. This is exactly the opposite of the situation in the Old Babylonian period, around 1650 BC: a nice example for the inadvisability of focusing all too strongly on the 'longue durée' of the Mesopotamian economy. Valuable items – land as well as movable goods such as animals or slaves – were as a rule bought and sold for silver only. As an illustration of the change, we quote here from an as yet unpublished sale document dating to the reign of Nabû-mukīn-apli (mid-tenth century BC) (Weszeli in press[4]): a plot is sold for

> "1,000 shekels of silver, viz. 4 slaves for 240 (shekels) of silver, 4 leading oxen for 120 (shekels) of silver, 6 Amorite donkeys for 180 (shekels) of silver, 10 shekels of red gold for 120 (shekels) of silver, 44 (*kurru*) of barley, per *sūtu* 6 *qa*, for 98 (shekels) of silver, 5 *kurru* of wheat for 20 (shekels) of silver, 12 *kurru* emmer wheat for 24 (shekels) of silver, 1 (*kurru*) of cress for 6 (shekels) of silver, 3 *kurru* 1 *sūtu* oil, per *sūtu* 3 *qa*, for 91 (shekels) of silver, 3 *ṣibtu*-garments (made) of *naḫlaptu*-cloths, in addition to *loincloths* and blankets[?] for 28 (shekels) of silver, ..., 2 *reins* (made of cloth) for 7[1] <(shekels) of silver>, 1 [black[?]] *naḫlaptu*-garment for 7 <(shekels) of silver>, 6 iron [.]..-knives <<for 10>> [(rev.)]for 12 (shekels) of silver, 21 sheep for 21 (shekels) of silver, 2 bows *ditto* 8 (shekels) of silver, 1 copper spade for 1 (shekel) of silver, 2 old sacks for 2 (shekels) of silver ... all in all 1,000 (shekels) of silver"

Large value transactions that were reckoned in silver but were conducted in kind in this way never occur in our period; simple silver payments are the rule.

But also (comparatively) low-value commodities changed hands for silver; 'cheap' monies (barley, wool, base metals) and barter were not the only means of acquiring items of everyday consumption. For goods whose money values range between one and four shekels of silver (which is forty to 160 percent of the median monthly wage, 2.5 shekels, around 550 BC) silver was demonstrably the predominant means of payment. For goods costing less than a shekel, there is documentation that silver amounts as small as 1/40 of a shekel, 0.208 g (the equivalent of three litres of barley) actually changed hands. But as low-value transactions were normally not recorded

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2 This is argued in detail in Jursa 2010: 466ff.

3 See Janković 2008: 449ff.

4 A study by M. Weszeli of on prices in the eleventh, tenth and ninth centuries BC based on these and other new data is forthcoming.

in writing it is impossible to establish the share of silver transactions in the total of transactions involving everyday goods. Even a superficial comparison of prices (or equivalents) of dates and barley attested in earlier Mesopotamian sources with Neo-Babylonian prices (see below) shows that the purchasing power of silver in our period had diminished to between half and a third of what it had been in these earlier periods.[5]

Silver was the usual means of paying house rents; agricultural rents on the other hand were normally paid in kind in the sixth century, only in the fifth century do field rents reckoned in silver money appear more frequently: this is an important difference between our period and the later centuries that are studied by Bert van der Spek and his project. Lending and borrowing at interest as a genuine independent business activity usually involved money loans, not loans of staples. Only a few debts in kind bore interest. Silver was also the normal form in which wealth was invested in business partnerships; staples (dates or barley) occur only infrequently.

The extent to which silver money was used for hiring labour and in the context of taxation is an important indication of the degree to which the economy as a whole was monetised. There was a close link between taxation in a wider sense and the hiring of labour because of the ubiquitous practice of hiring substitutes for state-imposed labour obligations. Wages in kind were frequently paid to slaves and for part-time employment or very low wages, but even in these cases silver wages were not unusual. For the work of free hirelings who were demonstrably employed full-time, e.g., as harvesters or builders or for other strenuous duties, nearly always silver wages were paid. Hired labour was an ubiquitous phenomenon, as is beautifully illustrated by a letter written around 550 BC (CT 22, 133). A temple weaver is quoted as saying to his superior: "Let [my lord] give (me) money (*kaspu*) to hire labourers. I am beleaguered (*lamû'inni*) by men who are for hire, and my work cannot be done without the(se) hirelings."

Importantly, hired mass labour, rather than compelled labour, was the backbone of the labour force temples provided for the ambitious building projects to which they were required by the crown to contribute. These undertakings must have brought large amounts of money into circulation among the less affluent strata of the free population, both urban and rural. The agency of the crown played a major role in this respect: in the final count it provided much of the wealth that enabled the ambitious building projects of the period. The vast amounts of surplus silver that the Neo-Babylonian monarchy could spend in this way originated from the benefits of empire: the spoils from Assyria, the tribute from Syria. It is unlikely that the monetisation of the economy that we see in the sixth century would have been as far-reaching as it was had it not been for these particular political background conditions.

In the realm of taxation and payments for substitute labour service, silver money predominated (Jursa 2010: 645ff.). A few types of taxes called for payment in kind, but silver was used for the large majority of payments made in connection with state-imposed obligations, even before the 'tax reforms' of Darius. However, the link between these obligations and the attested payments was not straightforward. Both under the Chaldean monarchy and under Persian rule, the state was not so much interested in taxes paid by individual Babylonian households as in forced labour and military service – the 'tax system' was geared towards the mobilization of manpower for the crown rather than towards the acquisition of funds. Nevertheless this system had an effect on the use of money and the monetisation of the economy. In order to discharge their obligations, heads of households that were subject to royal demands for labour service hired substitute labourers or soldiers (who had to be paid in cash) if they could afford to do so. Private taxpayers therefore had to have access to silver: landowners at least were to some extent forced into the market for staples. Agricultural producers without additional sources of income had to sell some of their crops for cash; otherwise they would have lacked the means required for dealing with the demands made by the state. Also

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[5] See Jursa 2010: 630 note 3337. Old Babylonian (1800-1600 BC) barley prices are generally below 0.75 shekel per *kurru* (0.021 g per litre) during the reign of Samsuiluna; they increase to around 1.5 or more (> 0.042 g per litre) during the reign of Ammiṣaduqa (for more on the comparatively high barley prices during the late Old Babylonian period see Richardson 2002: I 279ff.). Ur III merchant accounts (around 2020 BC) state that one litre of barley equals roughly 0.028 g of silver and one litre of dates, 0.019 g. Our median price for barley is 0.069 g, the mean, 0.118 g; the median price for dates is 0.047 g per litre, the mean, 0.061 g. A comparison of the Old Babylonian data on slave prices (e.g., mean price of male slaves during the reign of Hammurapi: twenty-four shekel) to the corresponding Neo-Babylonian material (both mean and median price of male slaves are close to sixty shekels) yields a similar result.

indirect taxes (harbour taxes etc.) and occasionally genuine direct taxes extracted on the basis of land-for-service schemes were payable in silver.

In the Chaldean period, money spent on corvée labour was used locally. The principal recipients were large numbers of hirelings of urban and rural origin; this assured a wide circulation of this silver also among poorer strata of society. The Achaemenid period brought little change in the system before the end of the reign of Darius at the earliest (there was no widespread shift from taxation in kind to money taxes under Darius: in Babylonia, money had been the preferred means of taxation-related payments already under the Chaldeans). However, the cumulative load of labour and service obligations increased and may have peaked under Darius. The most important novelty of the period was the forced service of Babylonian corvée workers and soldiers outside the country, particularly in Elam. This caused a flow of cash out of Babylonia, but the system was set up in order to assure that a substantial part of the silver that was spent for this endeavour eventually ended up in local circulation again.

In the private sector of the economy at least, the financing of the different royal levies was organised in a decentralised, sometimes obviously improvised, *ad hoc* manner, but generally Babylonians ended up paying other Babylonians to do the necessary work. The members of Babylonian labour gangs that were sent to do service abroad were hired locally, i.e., in the taxpayers' cities of origin, and kept their local ties intact. Overall the Babylonian sources contradict the assumption that increasing tax demands under Darius might have dramatically drained the cash resources of the country. The bulk of 'tax money' was not hoarded, but spent for labour in one way or another. There was also no shortage of silver during any part of this king's reign. On the contrary, it is reasonable to assume that the system of taxation and labour mobilisation continued to contribute to the increased circulation of money among the less affluent parts of the population also under Darius, at the end of the sixth century.

In sum, it is clear that the role of silver in the economy expanded between the eighth and the sixth century. This development can be placed into historical context: it must be connected with the political circumstances of the late seventh and the sixth century when Babylonia was at the centre of an empire which drew, by compulsion or through trade, large amounts of wealth from the entire Near East. This allowed the purchasing power of silver to fall so far (in comparison with earlier periods of Babylonian history) to allow also low-value transactions. The spending policy of the Chaldean kings contributed substantially to this development by bringing large amounts of money into circulation. Few residents of Babylonian cities can have remained entirely untouched by the money economy. For the rural population, the monetisation of economic exchange will have been less far-reaching than for city dwellers. Much money flowed into the countryside from the city as payment for crops and for the labour of rural hirelings working in the city, or on the large-scale public building projects in the countryside. The rural population, even subsistence farmers living in villages, certainly had many uses for money. There was a need to pay direct taxes and various indirect taxes and fees, such as harbour dues and the like, substitutes fulfilling corvée duties or military service obligations incumbent on rural landowners received money wages, and the products of city-based craftsmanship also had to be paid with money. As stated above, however, agricultural rents were not normally paid in cash in the sixth century, field rents payable in money become common only in the fifth century: this is the most important reason to assume that while money had percolated into the countryside, its overall impact on the rural economic environment was (still) less profound than in the case of the urban economy.

Prices and price development

We begin by presenting some of the available price data are presented. All prices are in silver.

Barley prices: eighty-five price observations.

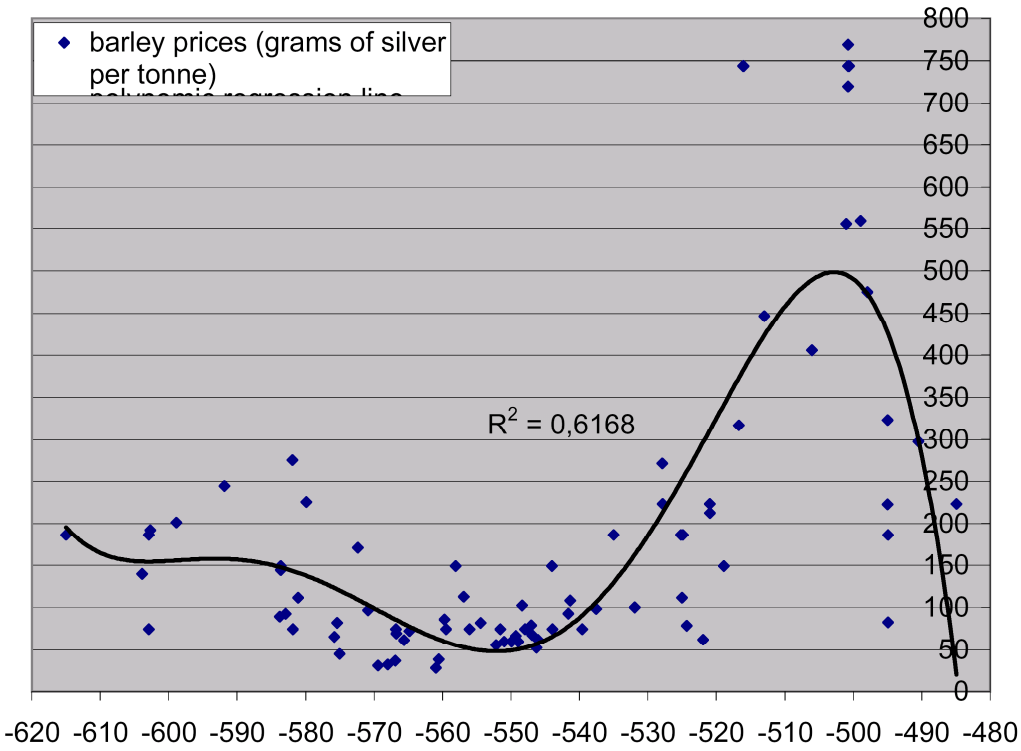

Fig. 1: barley prices in the sixth century

The general price trend is clear and sufficiently well-documented at least between 590 BC and the end of the sixth century: prices decrease until after -560, when they fall below the iconic one shekel per *kurru* level. After -550 they increase dramatically and peak towards the end of the century. The price level attained during these years is extraordinary: according to the Astronomical diaries, prices of over 500 grams per tonne recur only rarely in the late fifth century, in the late fourth century, in particular during the period of crisis after the death of Alexander and occasionally in the first century.[6] At the beginning of the fifth century, prices decreased to some degree: this section of the trend-line is based on eight price observations from 501 BC to 487 BC. These are more data than have been available in the past, but the end of the period is still sadly underdocumented. The median price is 111.6 g per tonne, the mean price, 190.5 g per tonne.

Sesame prices: forty price observations.

[6] See Vargyas 2001: 64ff.

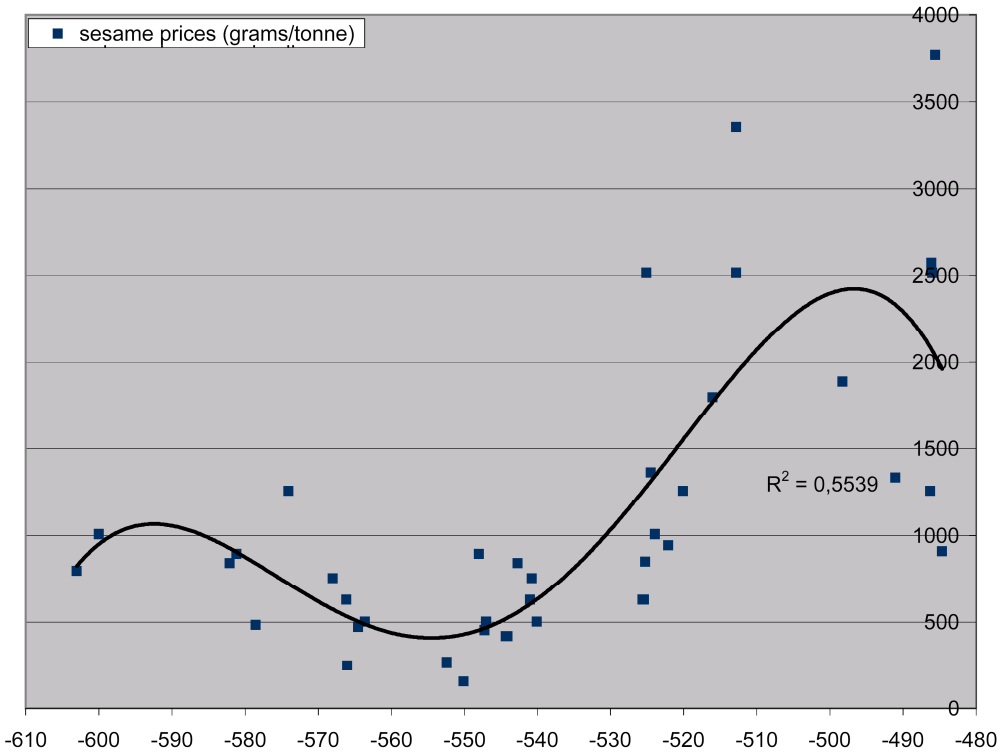

Fig. 2: sesame prices in the sixth century

The general development of the prices resembles that of barley: prices decrease until -550. From about -540 onwards, somewhat later than barley prices, they increase sharply and peak towards the end of the century. As in the case of barley, the price level attained in these years is quite high: such prices recur rarely in the price data of the Astronomical Diaries, e.g., during the late fifth century and in the late fourth century during the period of crisis after the death of Alexander.[7] The subsequent decrease suggested by the trend-line is based on evidence roughly as trustworthy as the identical development observed for barley: we have seven price observations from after the turn of the century. The median price is 844.3 grams per tonne, the mean price, 1120.6 grams per tonne.

Date prices: of the available price data, we use fifty-three price quotations, all referring to the sale of dates, most of them coming from Sippar. This means that the economic setting is demonstrably the same for all prices. This increases the value of the data.

7 Vargyas 2001: 230f.

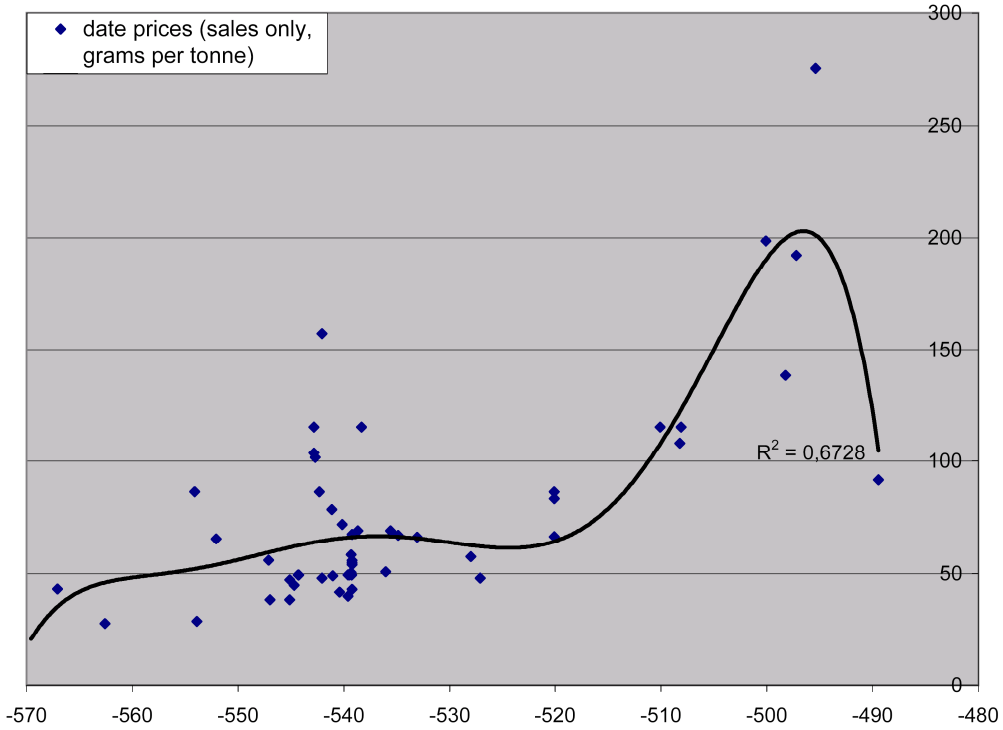

Fig. 3: date prices in the sixth century (sales only)

The by now expected sharp increase in prices at the end of the century is present; however, it starts much later than was the case for barley and sesame, viz. around 520 BC. It is preceded by several decades of essentially stable prices; at best there is a moderate rise around the middle of the century, followed by an even more moderate decline during the early Persian period. The price level attained at the end of the century is high, but not quite as high as the prices cited by the Astronomical Diaries for the difficult post-Alexander years and other periods of crisis. The mean price is 77.3 grams per tonne, the median, 62.

Wool prices: the scatter graph is based on eighty-five price observations. Most of them come from wool sales. Until the middle of the century, most of the data are from Uruk, later data come predominantly from Sippar.

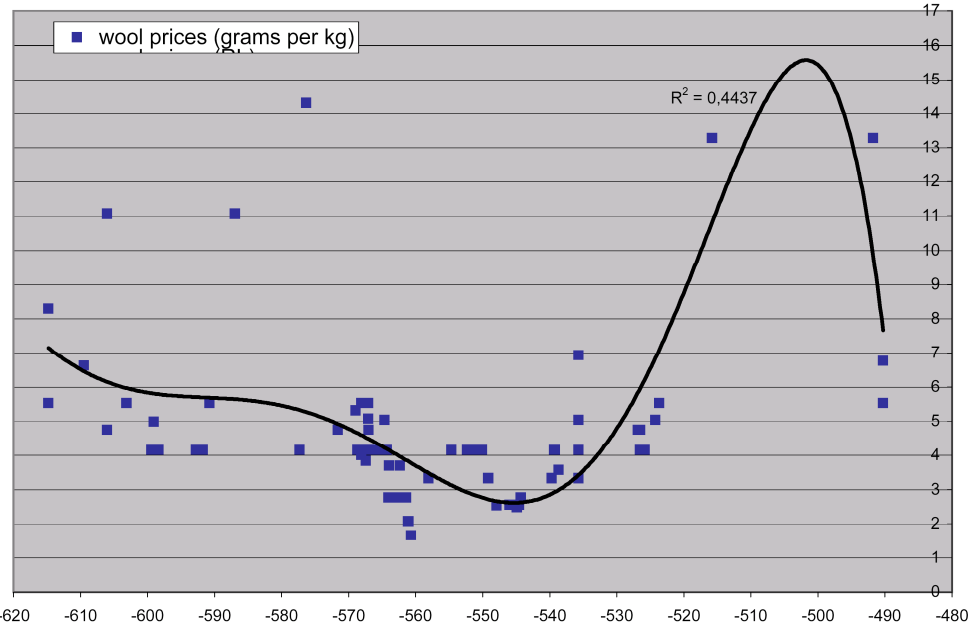

Fig. 4: wool prices in the sixth century

The general trend would seem to be more or less identical to the one observed for barley, however, there are very few price observations for the Achaemenid period (post 539 BC).[8] The mean price is 4.7 grams of silver per kg, the median, 4.2.

Sheep prices: 103 price quotations, mostly from Sippar, mostly reflecting the same economic situation: a temple purchasing sheep from private sellers. Prices are in Babylonian silver shekels (8.3 g).

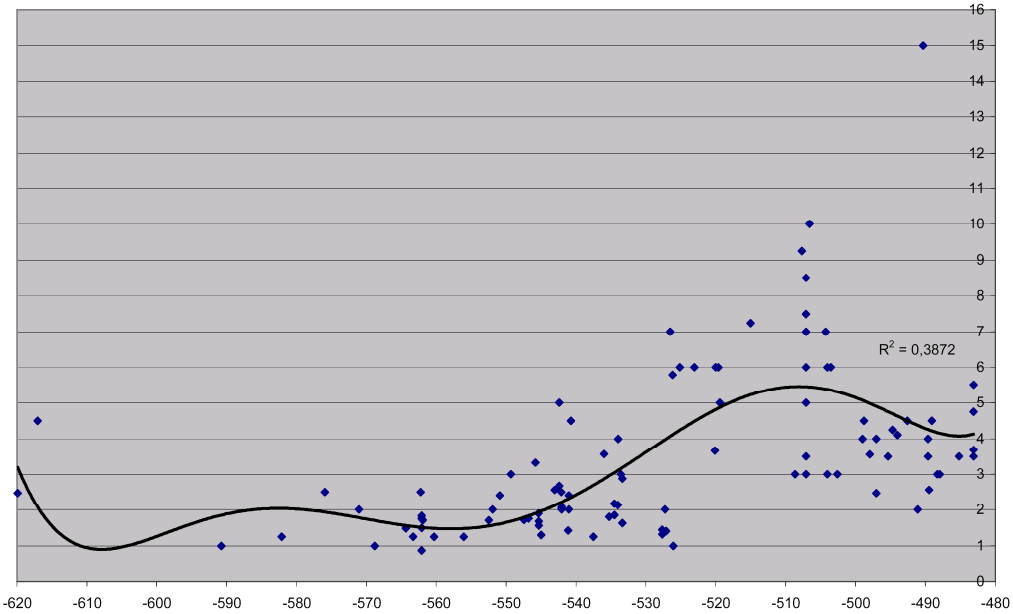

Fig. 5: sheep prices in the sixth century

Only from about -570 onwards is the information sufficiently dense to warrant an interpretation of the trend line: prices first remain stable (at less than two shekels per sheep). They start to increase in the early -540ies, i.e., already during the reign of Nabonidus, and peak around -505, i.e., in the middle of Darius' second decade. Afterwards they fall again to the level of -530. The mean price is 3.47 shekels, the median three shekels exactly.

Slave prices: The scatter graph below contains ninety price observations. Only adult male slaves have been taken into account. Most prices were gleaned from slave sale contracts from private archives: the economic setting is the same for nearly all the texts. Prices are in shekels.

[8] However, proxy data (prices of woolen garments, sheep prices) suggest that wool prices indeed followed the general trend in this period.

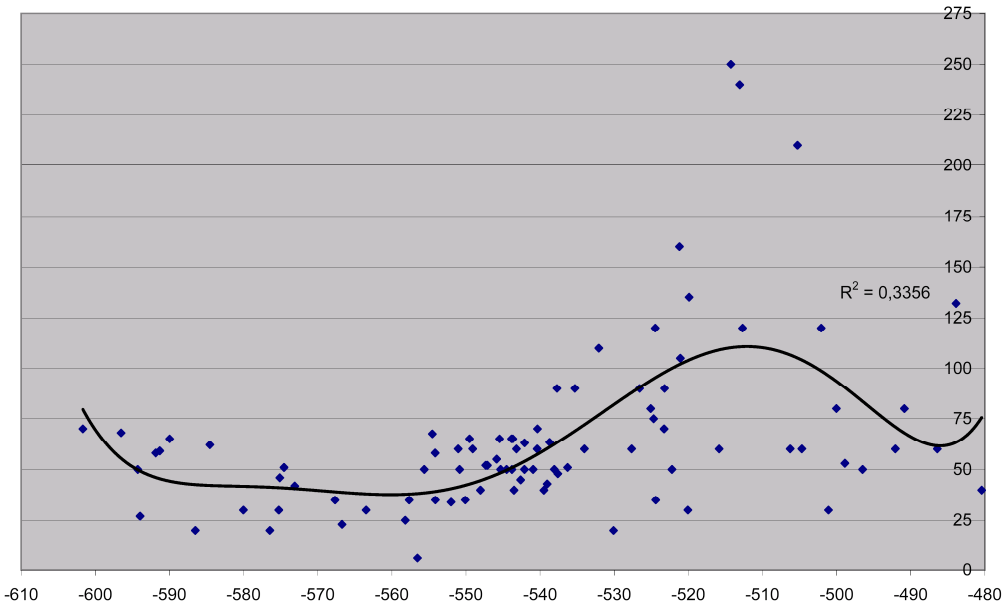

Fig. 6: slave prices in the sixth century

The distribution of price attestations throughout the century is sufficiently even to allow a reconstruction of price behaviour from the beginning of the sixth century until its end. Prices fall at the beginning of the century and then remain fairly stable until close to -550. Then they rise and peak around the year -510. This is followed by a decrease to the level attained at -535. In other words, the price trend is very similar to that of sheep. The mean price is 64.65 shekels, the median price, fifty-eight.

Prices of agricultural land are well documented. However, it is difficult to use them for statistical purposes as land is a commodity of very variable quality, which in addition is not always communicated in sufficient detail in the sources. In the following scatter graph we present to most homogenous body of data, the prices of date gardens in the region of Borsippa and Babylon (prices are in shekels per *kurru* of land [1 *kurru* = 1.35 ha in Babylon]; we have forty-one price observations).

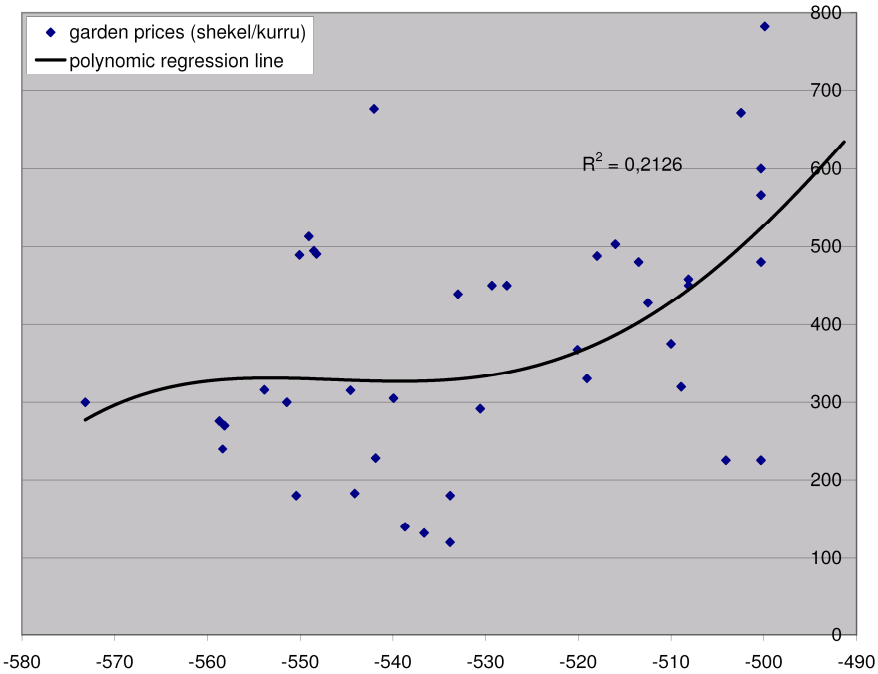

Fig. 7: garden prices in Babylon and Borsippa in the sixth century

It is not surprising that data for real estate prices should scatter widely (R^2 = 0.21): agricultural

land is a very variable commodity, numerous factors could come into play and cause a wide range of price differences even within the same general category of land, as is the case here for productive date gardens. Nevertheless, the trend line must be given some weight for the period after -550: for this period it is based on adequate data. At first there is very little discernable movement, but in the mid -520s we see the beginning of a rise in prices. However, for the standards of this part of the sixth century, the price rise is modest. At the most it will have led to an increase of ('only') about sixty to eighty percent over the level prevalent during the reign of Nabonidus. Other data series exhibit at least a tripling of price levels by -510: the garden prices were undoubtedly affected by the general price trend of the century's final decades, but to a significantly lesser extent. The mean of the prices included in this graph is 384 shekels per *kurru*, the median 371. The coefficient of variation is 0.42.

The following graph compares the development of these price series.[9] We use moving ten-year averages, whose values for -560 have been set at index = 100.

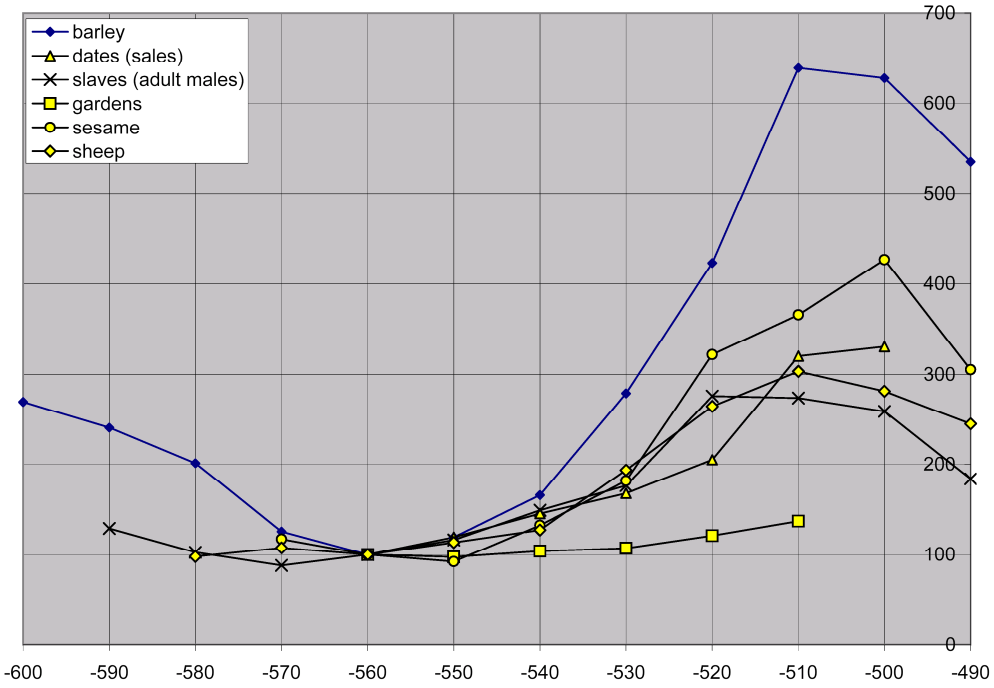

Fig. 8: the price development of commodities, slaves and land in comparison (-560 = index 100)

Those data sets that contain sufficient information (slaves and barley) suggest falling prices at the beginning of the century. This trend was reversed around the middle of the century, when barley, sheep, date and slave prices started to increase: it should be noted that the general increase in prices began before the fall of the Babylonian empire to the Persians in 539 BC. Only in the case of dates there was a slight interim reprieve from roughly -540 to -520, i.e. until the beginning of the reign of Darius. The increase was dramatic in case of barley and less pronounced, but still quite strong, for the other commodities. Even the otherwise very stable garden prices exhibit a moderate increase in step with this general trend. The increase culminated around -510 or slightly later; the very end of the sixth century and the beginning of the fifth experienced again falling prices.

The data concern diverse commodities that depend on quite different supply and demand structures and come from sources of different geographical and socio-economic origin. Seasonal variations,[10] short-term price crises for individual goods and generally the high volatility of prices exclude that we are dealing with administered prices (as has been suggested by some scholars in the past). Nevertheless the prices, with exception of the land prices follow roughly the same long-term trend. This means that they reflect a single economic system, the monetised sector of the

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9 We have excluded the wool prices, for which moving ten year averages cannot be plotted after -530.

10 These can be shown to have existed by statistical means in the case of barley; for dates, this is more difficult as the large majority of prices are post harvest prices. However the texts show that Babylonians were aware of the seasonality of agrarian prices and exploited this phenomenon.

Babylonian economy, and that in this sector of the economy prices were determined primarily by the interplay of supply and demand[11] – no other mechanism could have yielded a similar consistent result.

The land prices follow the general trend only in a very mitigated fashion. From a legal viewpoint, land could be sold freely, but it is possible, especially in the realm of the Borsippean priesthood, a social group that insisted very strongly on its exclusive nature and was not at all open to outsiders, that land transactions were subject to social constraints that influenced price development. Other factors, such as the increase of the tax load attached to landownership, may have rendered land relatively speaking less attractive, thereby counteracting the general trend towards a steep price increase in the second half of the reign of Darius.

We will not go here into the reasons for the price development in the sixth century. Suffice it to say that the decreasing prices in the first half of the sixth century are easily explained in view of the general economic recovery and expansion of the time, while the rising prices thereafter, especially the steep increase of prices after 520 and the subsequent decrease around the turn of the century are more difficult to understand. Monetary factors are probably decisive (see Jursa 2010: 745ff.).

Market integration and market efficiency

What do these prices, and what background material we have, tell us about market efficiency and market integration? The institutional infrastructure on which commercial exchange depended, i.e., the market places, are only occasionally mentioned in the sources: we hear about *sūqu* "street market", *kāru* "harbour district, commercial quarter", and about buying and selling at city gates. We can consider as conclusively proven that the commodity prices reflect a single economic system, the monetised sector of the Babylonian economy, and that in this sector of the economy prices were determined primarily by the interplay of supply and demand. Importantly however, the evidence for factor markets is more ambiguous. A labour market of sorts existed; the available wage data would be congruent with the assumption that wages followed the general price trend especially in the second half of the sixth century.[12] We have already pointed out that the land market was not fully synchronised with the commodity markets. Finally, one should probably not speak of a 'capital market.' Credit for productive purposes was available, but the mechanisms which brought investors and businessmen together, while generally poorly understood, were as likely to have been social as strictly economic. Interest rates were potentially subject to negotiation between the parties concerned, but custom and in part also interference by cities or the crown strongly promoted a standard rate (of twenty percent p.a.). Looking forward to the period treated by B. van der Spek and his group, an important problem is posed by the clearly increasing interest rates, which by the late fifth and early fourth century reach routinely between thirty and forty percent p.a. These high interest rates of the late period are paralleled in the contemporary Aramaic documentation; we do not know, and to the best of our knowledge it has not been investigated, whether these exceptionally high rates, which in Babylonia furthermore constitute a break with a millennial tradition, are owed to social change, legal interference, or economic change.

A survey of Babylonian economic geography shows that it is justified to consider the country in our period a single integrated economic space. All its regions were interacting with the centre, Babylon, and to a lesser degree with each other, especially along the (western) Euphrates route. Of the well-documented cities, only Nippur was anomalous; its region was comparatively isolated. Goods and persons could, and did, travel freely. Bulk transport of staples across the entire country was feasible at moderate cost owing to the ubiquitous availability of water transport. This is well illustrated by a letter fragment from southern Uruk in which temple officials are informed by their agents about grain prices in the centre and the north of the country: "(beginning lost) ... the prices which the servant has written us about, viz. forty-eight litres of barley in Babylon and Borsippa for one shekel (of silver), and sixty litres of barley in Sippar and Opis ..." (W 3381 z). Shipping grain from Uruk in the south up-stream to Sippar in the north of the country, over a distance of somewhat less than 300 kms, cost about ten percent of the grain shipped, excluding tax; with tax, the total cost amounted to close to twenty percent (Weszeli in Jursa 2010: 144f., according to NBC 4775). In

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11 Supply and demand of goods *and* money.

12 But real statistical proof cannot be given.

comparison to the prohibitively high costs of land transport, these relatively low transaction costs can be considered one of the main advantages of Babylonia over many other pre-modern economies. On the other hand we can exclude on this basis that even water transport of bulk goods was feasible for much longer distances: getting a cargo of barley from Uruk to central Syria along the Euphrates would have been prohibitively expensive. Babylonia was an integrated economic space, but at least for agricultural products it was also a basically closed space.

Efficient transport and the resulting low transaction costs have a direct bearing on market efficiency. Nevertheless, the case for market efficiency in Babylonia should probably not be overstated. Just as in the case of Egypt in Late Antiquity, for which a similar argument has been made,[13] we are dealing with 'comparatively' efficient, 'comparatively' integrated markets: market failures were a common occurrence. Several of our most explicit references to (physical) markets as places of buying and selling in fact refer to market failures – they point out that there was nothing to buy or sell.[14] As discussed by Bert van der Spek *et al.*, the volatility of commodity prices in Babylonia points to a low degree of market integration – much of the short term variation in prices may well have been owed to problems of distribution rather than to actual scarcity or oversupply throughout the country.[15] "Supply and demand were not easily paired. Commerce could only react slowly to sudden market developments."[16] Dismissing i.a. Rathbone's claim for Egypt having an integrated market for wheat and wine, Bang has recently suggested a 'new' concept to describe the nature of markets of complex agrarian societies, viz. the *bazaar* (Bang 2006: 77ff.). Basing himself on data from the pre-industrial Middle East and North India, he sees the *bazaar* as a "particular socio-economic system," "a place of high risk and uncertainty where bottlenecks, asymmetries and imbalances were endemic." "It combines the presence of peddlers and small retailers with large wholesale merchants and long-distance trade while at the same time recognising that these categories were ... fluent and ... not ... clearly distinct." The term "can be used to denote a stable and complex business environment characterised by uncertainty, unpredictability and local segmentation of markets" (all quotes: Bang 2006: 79). Especially the last point, the juxtaposition of a stable institutional background for commerce and instability resulting from contingent external factors is clearly useful and applicable to our evidence.

For Bang, economic agents in the *bazaar* developed typical sets of behaviour which minimised commercial risk in this environment but at the same time perpetuated the general condition of unpredictability and volatility.[17] These strategies include parcelling of capital, low standardisation of products, opportunistic speculation (to allow profiting from irregular and excessively high local prices) and the formation of segmented social networks. The first point could also be made for Babylonia: we have pointed out above that trading companies tended to operate with modest amounts of money only, even though the available legal instruments would have allowed a greater accumulation of capital with multiple investors. The second point applies especially to prestige goods and items procured through long-distance trade; we can assume that also in Babylonia "merchants ... attempted to profit on variability" (Bang 2006: 82), but it cannot be proven. 'Opportunistic speculation' on the other hand was certainly part of the world of Babylonian trade: there was of course an awareness of seasonal as well as regional price differences which were exploited by 'harvest loans' and similar transaction types. Finally, the assumption that the archetypical *bazaar* trader operated in "segmented social networks" fits the prosopographical data of some of the larger entrepreneurial archives of our period very well; it is in fact true for Babylonian society at large which is distinguished by a clear wish for ethnical segregation on part of the urban Babylonians.

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13 Rathbone 1997.

14 Jursa 2010: 642. But it should be taken into account that these statements come from letters which report the exceptional, not the ordinary.

15 See also, e.g., van der Spek and Mandemakers 2003: 532. But the point concerns not so much integration in the "world market" – this is excluded for staples at least –, but market integration from a purely Babylonian perspective.

16 Bang 2006: 61, on the economy of Late Antiquity. See also his book-length study Bang 2008 (on which see von Reden 2010).

17 The following is based on Bang 2006: 80ff.

Bang's *bazaar* economy can clearly be considered a useful heuristic concept for Babylonia in the first millennium BC, but it should be developed further, taking into account the particular ecological and economic background conditions. We would follow Rathbone (1997) against Bang (2006: 64ff.) in assuming that ubiquitous cheap river transport must have allowed Late Antique Egypt, or Babylonia, for that matter, to achieve a higher degree of market integration than found in other pre-modern economies lacking this ecological advantage – even if market integration and market efficiency may still have been 'low' by contemporary (or, which is more relevant, by early modern) standards. Market efficiency, or market stability, expressed in terms of price volatility can be quantified. One standard method for measuring volatility is using the "coefficient of variation" (CV), which is the standard deviation of a price series divided by its mean. The data are summarised in the following table. Prices are in shekels of silver per item (sheep, slaves), one *kurru* of staples (barley, dates, sesame), five minas (wool), or one *kurru* of surface area (date gardens).

	All data (sixth century)			Ca. 570-539 BC		
	mean	median	CV	mean	median	CV
Barley	2.56	1.5	0.99	1.04	1	0.42
Dates (sales)	1.32	1.01	0.6	1.07	0.91	0.43
Sesame	13.37	10.07	0.77	6.81	6	0.47
Sheep	3.36	3	0.58	2.05	1.81	0.43
Slaves	64.65	58	0.64	49.62	50	0.31
Wool	1.4	1.25	0.49	1.28	1.25	0.22
Date gardens	384	371	0.42	336	300	0.43

Table 1: median and mean prices and coefficients of variation

We have set out in the table the median and mean prices for the entire data series and for the final three decades of the Chaldean period, a phase of generally low and relatively stable prices. The coefficients of variation for the latter period are significantly lower than for the former period, and they are also quite similar to each other: those for barley, dates and sesame range from 0.42 to 0.47; only that of wool is considerably lower (0.22). This reflects the comparatively stable economic conditions prevailing during the middle of the sixth century. In contrast, the coefficients of variation of barley, sesame and dates for the whole data series range from 0.6 to 0.99 – the difference is the result of inflation and the supply crisis for barley of the final decades of the sixth century. The coefficients of variation for the prices attested in the Astronomical diaries fall into the same order of magnitude as our results: for barley, P. Földvári and B. van Leeuven have calculated a CV of 0.961 for the period of 385 to 250 BC, of 0.65 for the period of 250-150 BC and of 0.824 for the period of 150-61 BC (see the papers presented by B. van der Spek and his group, and the bibliography cited there). This can be compared, e.g., to the data complied in Söderberg 2004: 5, Table 2. Grain prices in Mamluk Egypt have CVs of around 0.79-0.85; in medieval Europe (1260-1512), variation was lower: e.g., London 0.412, Tuscany 0.414, Leiden 0.39; exceptional values: Valencia 0.161, Stift Klosterneuburg 0.726. Early modern data tend to be somewhat lower, but are not vastly different.

Such figures lend plausibility to our Babylonian data. We are certainly dealing with an often unstable market and a remarkable volatility of prices, and there was always the possibility of supply crises. Nevertheless, it is an indication of the relative *efficiency* of the Babylonian market or *bazaar* that the volatility of commodity prices in sixth-century Babylonia as measured by the coefficient of variation comes so close to that encountered in these much later economies.

Market integration & efficiency: regional diversity and further questions

The foregoing conclusions are based on a comparatively crude statistical analysis of the data. One way forward might be a quantitative analysis of the interrelation between different commodity prices, in particular between barley and dates, to explore further the effects of the Babylonian dual-crop regime on prices. We have not investigated this issue.

The textual data have not yet been sifted exhaustively. Much qualitative information that is pertinent to the topic of the present conference can still be culled from the temple archives in particular: K. Kleber's paper is a good example. A similar study on the famine of the eleventh and twelfth year of Nabonidus by the present author is in preparation. The pertinent dossier suggests

that this phenomenon was noticeable, albeit to varying degree, throughout all of Babylonia, it was not limited to Uruk where it has been recognized first.

The available price data come mostly from two sites, Sippar in the north of Babylonia and Uruk in the south. We have established on the basis of qualitative information the basic integration of all of Babylonia into one economic space (see above). Nevertheless it would be desirable to provide also a quantitative argument, on the basis of a comparison, rather than a conflation, of the Sipparean and Urukean data sets: price levels might be marginally, or even more than marginally different. Unfortunately, only the data set for barley, apart from the anomalous case of wool, exhibits a sufficient degree of temporal overlap of the data from Sippar (and generally from northern Babylonia) with the data from Uruk:

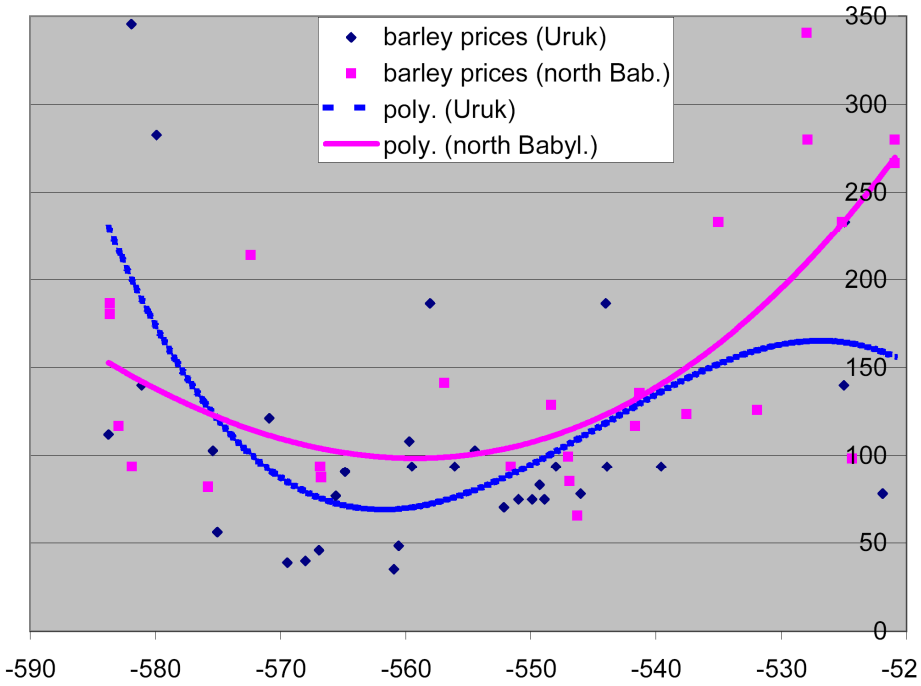

Fig. 9: Barley prices in Uruk and in northern Babylonia in comparison

Between -580 and -530 the data series overlap and are sufficiently dense to warrant an analysis of the price trends. For much of this period, Urukean barley is cheaper than barley in northern Babylonia. Uruk prices catch up with Sippar prices around the time of the conquest of Babylonia by Cyrus (539 BC). In fact, the price increase that begins in the second decade of Nabonidus' reign is noticeable in both cities/regions, even though for Uruk we do not have data for the reign of Darius (post -522), when barley prices in Sippar reached unprecedented heights. The difference in price levels that we see between ca. 580 and 550 BC is pleasing, as it conforms to expectations. The south of Babylonia, especially the Sealand around and south of Uruk was much more a grain-producing region than the north, where there was a strong tendency to favour horticulture over arable farming. This agrarian imbalance is reflected in our prices. The market did not level out these fundamental differences (nor was it likely to have done so: the distance, after all, between the two regions in question is substantial): it is perhaps more remarkable that the difference was not more noticeable - another indication of the relative efficiency of the Babylonian market. The north-south divide in the price level of barley is also reflected in wage levels: during the reign of Nebuchadnezzar, the Eanna temple of Uruk paid its dependents somewhat wages in kind than the Ebabbar temple of Sippar in the north (Jursa 2010: 296ff.). A Urukean temple serf normally received ninety litres of barley or dates (or the equivalent in silver money), sometimes even less. The Sipparean norm however was 180 litres, a wage level that Eanna reached in a consistent way only late during the reign of Nabonidus, in the 540ies, when according to our price data barley prices in the south had caught up with barley prices in the north. This observation has two methodological consequences. First, it proves the existence of a nexus between the institutional

wage standard (and by extension also the wage standard for free hired labour) and the general price level and thereby illustrates (again) how the market had formed (transformed) even the core areas of the institutional economy. Second, institutional wage levels, even regarding wages in kind, can be used as proxy data for prices and indirectly also for money wages paid to institutionally unattached, free labourers. This allows a fruitful approach to the wage ('ration') lists of the Esangila archive that date to the late Achaemenid period (see the paper of J. Hackl).

Final questions

The quantitative data culled from Babylonian sources of the sixth century BC and (summarily) presented here reflect an economic system that had a complex agrarian base and relied strongly on monetary exchange and relatively efficient market mechanisms. The various phenomena characteristic of the 'commercialisation model' that was described in the introduction are traceable in the sources and can be integrated into a coherent vue d'ensemble. The implications for the later centuries of the first millennium BC have yet to be explored: it is not entirely clear which of the particular economic circumstances of the sixth century survived into the fifth and later centuries that are studied by van der Spek *et al*. Monetisation of exchange may have increased at least initially in this period, if the frequent fifth-century attestations of rent payments in silver rather than in kind are any indication. Understanding the monetary system of the time however would need an explanation of the increase of the interest rates, which seems currently not yet in reach.

Bibliography

We list here also a few important books that are not explicitly cited in this pre-paper but were nevertheless important for its production.

Adams, R. McC.

1981 *Heartland of Cities, Surveys of Ancient Settlement and Land Use on the Central Floodplain on the Euphrates*. Chicago and London.

Bang, P.F.

2006 "Imperial Bazaar: towards a comparative understanding of markets in the Roman Empire," in: P.F. Bang *et al*. (eds), *Ancient Economies*, *Modern Methodologies*. *Archaeology*, *comparative history*, *models and institutions* (Bari), 51-88.

2008 *The Roman Bazaar. A comparative study of trade and markets in a tributary empire.* Cambridge.

Dercksen, J.-G.

1999 *Trade and Finance in Ancient Mesopotamia* (*MOS Studies* 1) (PIHANS 84). Istanbul.

Fernea, R.A.

1970 *Shaykh and Effendi. Changin Patterns of Authority Among the El Shabana of Southern Iraq.* Cambridge (MA).

Hatcher, J. and M. Bailey

2001 *Modelling the Middle Ages. The History & Theory of England's Economic Development.* Oxford.

Hopkins, K.

1978 "Economic growth and towns in classical antiquity," in: P. Abrams and E.A. Wrigley (eds), *Towns in Societies. Essays in Economic History and Historical Sociology* (Cambridge), 35-77.

Janković, B.

2008 "Travel provisions in Babylonia in the first millennium BC," in: P. Briant *et al.* (eds), *L'archive des Fortifications de Persépolis. État des questions et perspectives de recherches* (Paris), 429-64.

Jursa, M.

2008 "The Remuneration of Institutional Labourers in an Urban Context in Babylonia in the First Millennium BC", in: P. Briant *et al.* (eds), *L'archive des Fortifications de Persépolis. État des questions et perspectives de recherches* (Paris), 387-427.

2010 *Aspects of the Economic History of Babylonia in the First Millennium BC: Economic Geography, Economic Mentalities, Agriculture, the Use of Money and the Problem of Economic Growth*. With contributions by J. Hackl, B. Jankovic, K. Kleber, E.E. Payne, C. Waerzeggers and M. Weszeli. Münster.

Millett, P.

2001 "Productive to some purpose? The problem of ancient economic growth," in: D.J. Mattingly and J. Salmon (eds), *Economies beyond agriculture in the classical world* (London and New York), 17-48.

Morony, M.G.

1993 "Commerce in Early Islamic Iraq," *Asien Afrika Lateinamerika* 20, 699-720.

2004 "Economic Boundaries? Late Antiquity and Early Islam," JESHO 47, 166-94.

Reden, S. von
2010 Review of Bang 2008, *Gnomon* 82/8, 720-724.
Söderberg, J.
2004 "Prices in the Medieval Near East and Europe," www.iisg.nl/hpw/papers/soderberg.pdf (31.7.2009)
Watson, A.M.
1983 *Agricultural innovation in the early Islamic world. The diffusion of crops and farming techniques, 700–1100.* Cambridge.
Weszeli, M.
In press "A New Boundary Stone of the Reign of Nabû-mukin-apli (978-943 BC)," *Iraq.*