Number 7

Title: The Structure of Prices in the neo-Sumerian Economy (I);
Barley:Silver Price Ratios

Author: Eric L. Cripps

Posted to web: 25 September 2017
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Eric L. Cripps

Department of Archaeology, Classics and Egyptology
University of Liverpool

Introduction
The debate in Sumerology about how prices of commodities and factors of production were determined in the economies of third millennium Sumer has to an extent been shelved, and given the constraints imposed by the limited and opaque data available from all periods in ancient Mesopotamia is largely unresolved. Conceptualisations of the mechanisms which allocated resources in the Sumerian economies of southern Mesopotamia vary, though not wildly, with the often anachronistic theories and models adopted to describe the structures and production processes in which they are embedded. A near consensus is that the most credible model of the third millennium economic system controlled by Sumer’s institutions, from the “oikos economy” of palace and temple households of the Early Dynastic to the provincial governments of the Ur III state, may be categorized as “redistributive”.¹

There is not much doubt that, normally, ancient Mesopotamian agriculture produced a surplus. Agricultural production by Sumer’s institutions was organised to exceed its redistribution to dependent labour and administration, not only to buffer poor harvests but also to support cult offerings to temples, to finance and otherwise provision internal and external trade via merchants, and to fulfil the taxation requirements of the state.

Given that the overwhelming majority of cuneiform texts from third millennium Mesopotamia are administrative texts from the accounting systems of temple, palace and state, we are confronted with largely insurmountable difficulties in attempts to construct a much different model of the Sumerian economy. Most of the texts tell us that we are dealing with a highly centralised and centrally controlled economy, especially during the Ur III period; indeed, Englund (2012a:427) has labelled it a “command economy”.

However, although the redistributive model is the prevailing theory of the structure of the Sumerian economy, there remains substantial variation in interpretations of the embedded processes which allocate resources between various activities within production processes. Disputation is due mainly to differing conceptions of how prices, whether of commodities or factors of production, are determined, and largely reduces to whether prices result from the interaction of “supply and demand” in a market economy, are fixed by some central authority, or are a mixture of both. The notion that “markets, defined... as a system of exchanging and allocating resources by means of a price mechanism - with prices determined primarily by supply and demand”- were much in evidence in commodity and factor markets of Sumer, even accepting the

¹ The neo-Sumerian period refers to the emergence and territorial hegemony in southern Mesopotamia of the Ur III state and is conventionally dated 2112-2004 BC. The period encompasses the reigns of the kings of the Ur III dynasty thus: Ur-Nammu 2112-c. 2095, Šulgi 2094-2047, Amar-Suen 2046-2038, Šu-Suen 2037-2027, Ibbi-Suen 2026-c. 2004.

² For a recent, detailed text based analysis of the redistribution process, in this instance of the pre-Sargonic e₂-MI₂/4ba-ba₄ in Girsu, see Prentice (2010:13-95).

Scholars who largely reject Polanyi’s paradigm of the redistributive and so-called “marketless” economy, though they may acknowledge the economic dominance and distributional system of the governing institutions of the third millennium argue a central role for price making markets in the allocation of resources. Powell (1999:11), for example, suggested “there is good reason to believe that both market places and markets in the sense of economic mechanisms existed in Babylonia and that they were shaped by supply and demand like contemporary markets in Anatolia”. Powell’s rejection of Polanyi is partly motivated, as is that of other Assyriologists, by evidence from the Old Assyrian trade of the early second millennium, and partly by a philological analysis of Old Babylonian terms for “market” and its surrogates. Neither indication is from the third millennium, but as regards the latter, he argues that semantic developments like that of the word 

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kāru from a Sumerian loan into Akkadian would not have occurred if a similar community of merchants engaged in commerce had not been present in Sumerian cities in the third millennium. Powell also points to other Akkadian terms suggesting market places which may have Sumerian prototypes. The philological and archaeological evidence together with pottery typology argue against any radical hiatus between the Ur III and Old Babylonian periods assumed from the texts (Powell 1999: 10). We are to assume therefore, that markets existed in third millennium Sumer, at least during the neo-Sumerian period.

Polanyi, of course, specifically distinguished market place from market as in “price-making market system”. The first is the location where people meet to transfer or exchange goods, the second includes “the aggregation of such sites into a system, involving repeated exchanges of commodities; and a mechanism that determines the production and distribution of resources through supply-demand feedback”. To confuse the two is to make a categorical error. The first can be unearthed by the archaeologist the second cannot. Polanyi accepted that market places may have existed as early as the Neolithic whereas the price-making market system only arrived in the first millennium BC, in Greece (Dale 2013:162ff.). Although there is no written evidence of barter or local markets in the Ur III economy they must have existed. How else would ordinary people obtain their household goods and foodstuffs? This was structurally essential for the distribution of perishables and commodities not produced within non-institutional households. These local markets were for exchange not redistribution (Steinkeller 2004: 95-96)

Snell (1982:188), on the other hand, concluded from his study of prices, predominantly from the Ur III “silver accounts”, that variations in commodity prices arising from different transactions over very short time periods and sometimes even in the same merchant text, made it highly improbable that “Polanyi’s theories have any application to Ur III trading systems,...”.

Equivalencies and prices
In particular, Snell argued that the ratios of silver to quantities of other commodities in the silver accounts are prices not equivalences as suggested by Polanyi. “By equivalences Polanyi meant money amounts exchanged for goods not on the basis of supply and demand but on the basis of set equivalents established by authoritative decree or by custom” (Snell 1991:131). However, the evidence of transactions in the Ur III Umma merchant accounts showed that while it is possible a few products do seem to have fixed equivalencies, the prices of an overwhelming majority have prices determined by supply and demand. Those that may have equivalencies are of minimal economic significance. “Equivalencies do not dominate and Polanyi is irrelevant for most of the products with which the Umma silver balanced account system deals” (Snell 1991:135). It should be emphasised apropos Snell’s preference for “prices” rather than “equivalences”, however, that he

3 For a reassessment of Polanyi’s theories see now Dale (2013).
restricts this, but not every, aspect of his analysis to the “silver accounts” kept by the central institutions recording the trading activities of the Umma merchants on their behalf (Snell 1991:132).4

A polar opposite conclusion is arrived at by Englund from roughly the same data. He perceives the state imposition and monitoring of silver value equivalencies as accomplished by institutional household accountants who employed, “with almost dizzying accuracy, a broad palette of equivalencies as part of their means of control of production” (Englund 2012a: 427). The shekel of silver was the basis of valuing all commodities in the Ur III accounts with the prescribed norm of 1 shekel = 300 sila3 (“litres”) of barley as the basis from which all other equivalencies were derived.

The silver to “quantity of a commodity” equivalencies, are sometimes thought of as analogous to “transfer prices” in modern business corporations, fixed by administrative systems and only reflecting real market prices, applied to “in-house” flows of resources as essential for accounting and forward planning (Hudson 2004: 99,102). The use of the silver shekel to quantity equivalency in order to standardise comparisons of value in respect of a variety of different commodities in accounts thus became pervasive in the Ur III accounts and was not restricted to the silver/merchant accounts from Umma.

In this view, the Ur III pseudo-prices were not determined by the interaction of supply and demand in a market, but were normative prices, set and administered by the institutions, and the value of a given weight or quantity of a commodity was commonly ku3-bi (“its silver”). However, silver and barley with one shekel of silver set at a value of one gur (300 sila3) of barley “became equal standards of value against which other commodities were measured, creating a bi-monetary price ratio that was the first step in administering prices.” (Hudson 2004: 112).

Money and price
An essential precursor of any definition of prices whether determined by the interaction of supply and demand or fixed administratively is to identify the category of money which exists in the economy. Despite the often espoused notions that the majority of Assyriologists accept the existence of money in the Ur III state as self-evident (Ouyang 2013:17) or that because cuneiformists ubiquitously describe silver as “money”, “currency” or “cash” it clearly exists (Powell 1996:225), it is more appropriate to define the form of money in the neo-Sumerian economy as commodity money. “When a commodity is accepted in trade not to be consumed or used in production, but to be used to facilitate further trade, it becomes a medium of exchange and is called commodity money. If an object with no intrinsic value becomes a medium of exchange, it is called fiat money”, (Kiyotaki and Wright 1989: 929). In the Ur III economy both silver and barley were most commonly used as commodity money but on occasions other staples were too, particularly wool. Each was a medium of exchange and equally each had an intrinsic value, in that, at least some people derived utility from also consuming whichever of them was also used as a medium of exchange (Champ and Freeman 2001: 38).

It is essential to recognize the Ur III economy as a commodity money economy because it circumscribes direct barter as the principal mechanism determining prices in the economy.5 Such

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4 While the large majority of Snell’s prices are culled from the so-called silver or merchant accounts, his prices for “grain” in his table 6 on pages 138ff. contain as many examples from other sources as from “silver account” texts. This fact has a significant bearing on the analysis in this paper which is concerned with the barley:silver price ratio.

5 “A barter economy is one in which the goods one owns are traded directly for the goods one wants to consume. In a barter economy, no particular good is used as a medium of exchange”. (Champ and Freeman 2001:33-34). Trade in a barter economy requires what Jevons in 1875 called a double coincidence of wants, “the person with whom you wish to trade must not only want what you have, but must have what you want”. In more complex economies such
delimitation does not exclude the role of barter in local markets, but does point to its almost certain absence as a mechanism determining many of the so-called prices witnessed in the administrative texts from institutional households.

To what extent commodities other than silver, and specifically barley, were capable of fulfilling all of the economic functions of money may be uncertain. Since Jevons (1875: chapter III), economists have defined four functions of money. Firstly, money provides a unit of account and a standard of value. In the neo-Sumerian both barley and silver were used for this purpose. Secondly, money most obviously functions as a medium of exchange. Again, both barley and silver, predominantly, performed this role. Thirdly, money functions as a store of value. For this purpose, money needs to be capable of being kept for long periods of time. Silver and other metals were the most obvious candidates for this purpose. The precious metals of gold and silver have mostly performed this role, not only in history, but even today are regarded as investments and a store of value. However, gold was not so widely available as silver in the Ur III period, so that silver prevailed as the standard and store of value. Though, to state the obvious, barley could be stored for a while in granaries, it is much less obvious that it could serve as a store of value in money terms for very long. On the other hand, perhaps as much as, if not even more than silver, barley fulfilled the fourth function of money as a standard of deferred payment. Debts were repaid with both barley and silver for reasons which are examined later.

All prices are ratios, whether or not they are measured with commodity money or, as today, with fiat money. In the modern economy we calculate prices as a ratio between the quantities of commodities and money values measured in whichever currency is appropriate (nominal price). In the Ur III economy, the value of a commodity is expressed as a ratio between its quantity and the quantity of another commodity (relative price). Theoretically, the “dizzying array” of relative prices envisaged by Englund and which confronted the Ur III scribe, was extremely large in that as many price ratios could exist as the number of pairs that could be formed from the number of commodities in the system. In reality, the scribe would not have had to consider such a great number of price ratios. The quantity of each of all other commodities as a ratio of one commodity only, the shekel of silver or alternatively the gur of barley, was known. Therefore, the price of each commodity in relation to any other could be computed in a much smaller number of calculations. It is conceivable that with the increased complexity of the Ur III institutional economy and its accounting systems, the bi-monetary standard of 1 gur of barley to 1 shekel of silver became an essential device to reduce the dimensions of relative price structures to manageable proportions.

Be that as it may, whether we are considering relative or nominal prices, intrinsic to the definition of price is the process of commodity exchange. First and foremost, administered or market, price

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6 The extent to which silver could be regarded as commodity money available as a medium of exchange in both institutional and non-institutional sectors of the Ur III economy is disputed by some. Widell (2005:398-399), for example, argued that there were two economic “spheres” in the Ur III state, the institutional large scale economy in which silver was the medium of exchange and the local barter economy in which the medium of exchange was barley and which meant that prices in each sector were separate. However, see Cripps (2014:227-228) for a discussion and contra argument.

7 The number of pairs that can be selected from n commodities is no less than n(n-1)/2, or about ½ n². However, because a shekel of silver or its equivalent gur of barley is common to price ratios for each and every commodity, the scribe need only consider n-1 price ratios.
is “the quantity of one thing that is exchanged or demanded in barter or sale for another”. Whether or not the apparent price ratios in the Ur III corpus, especially of barley:silver, arise out of a process of exchange or potential sale is questionable. Their merit as a price and even as a measure of “equivalent value” requires a much more focussed analysis than we have seen hitherto.

Snell’s 1982 study of the Ur III prices of a wide variety of commodities remains the basis of information from which much Sumerological opinion and analysis regarding the measurement of value and commodity exchanges in the neo-Sumerian economy proceeds. Much of Englund’s data on silver equivalencies in his study of value in the Ur III state relies on Snell’s study (Englund 2012a:443). In his analysis of wool bought and sold by the institutional economy in Ur III Umma, for example, Sallabarger (2014:97, Table 6.1) estimates prices from Snell’s median wool price of 10 mina of wool per shekel of silver and regards this as the standard price relationship of wool. Although their own study of the prices of aromatics examines data added to the corpus since the texts available to Snell, the most recent data which Brunke and Sallabarger can consult to augment their own on aromatic product quantities and prices is also from Snell’s study (Brunke and Sallabarger 2010:71, fn. 39).

Fluctuating prices
Primarily based on the data from Snell’s analysis of the Umma “silver” merchant accounts, both Englund (2012a: 441-3) and Snell (1982: 189-196) call attention to fluctuations and instability in commodity prices. How much price fluctuation was tolerated or even encouraged by the administration in the Ur III period is unclear (Englund 2012a: 443). While 1 shekel of silver per gur of barley was held to be the “official notional value of barley during the Ur III period” there was a wide dispersal around this value (Widell 2005: 391-392).

The Umma merchant accounts, though relating to a relatively short period in the middle of the Ur III period, display noteworthy variations in the measures per shekel of silver for several of the same commodities. The value in silver of the staple barley, for example, varies by 180 per cent in these particular accounts. A number of credible reasons can be proposed for these fluctuations, “including exchange pressures generated by bumper harvests or a major influx of silver, conflict, drought, degradation of the fields through salinization, or other processes endemic to alluvial agriculture in antiquity” (Englund 2012a:443). Fluctuations in prices established by such influences may suggest their determination in exchanges in an early form of market system rather than one in which prices or equivalencies were “administered” or set by the administration.

Producers may have made pricing decisions in response to these influences and this was reflected in both “debts” and “credits” in the merchant accounts; in both the prices/values of the “capital” provided to the merchants by the administration and in the prices of the goods supplied to the administration by the merchants (Snell 1982:191). If these prices had displayed stability it would suggest price control by the administration.

However, price fluctuations may well have been tolerated and even inherent in the administrative system of acquiring commodities not produced by the central institutions themselves. Merchants or “trade agents” may even have been required to obtain set amounts of the products needed by the provincial administration regardless of price. The “capital” with which merchants were resourced was sufficient to allow whatever expenditure was necessary. “The prices in the silver accounts may therefore be as regular or as irregular as the price setters wanted.” Expenditure by

8 Merriam-Webster Dictionary.

9 Widell also used a fairly limited set of data from Umma texts from the period AS 1 to ŠS 8.
the merchants would always be covered (Snell 1982: 189-190). Clearly, if such was the practice, recorded prices or equivalencies were unlikely to be centrally administered.

On the other hand, few of these determining factors may apply if the barley:silver ratios turn out not to be market prices.

The barley:silver price ratio

As a first step in the study of Ur III price structures, we need to ask if there is substantial evidence in the texts for a standard of 1 gur of barley = 1 shekel of silver to which other prices could be related and to evince any information there might be about how the price of barley or that of silver may have been determined. It may also be relevant to understand how and why these price ratios varied over time. Surprisingly, given the almost polarised interpretations of the mechanisms in the Ur III economy which determine prices, there is a long established consensus that in the neo-Sumerian period that 1 gin₂ (“shekel”) of silver = 1 gur (300 sila₃) of barley. This relationship is held to be more or less so, on the one hand by those who primarily regard prices or equivalencies as administered/set by decree (Englund, Hudson) and on the other by those who would rather support the notion of a price-making market system (Powell, Snell).¹⁰

The remainder of this article is therefore devoted to the textual evidence in the Ur III corpus relating to the barley: silver price ratio. For the most part my analysis will understand relative prices or price ratios as prices rather than equivalencies but with a view, at least prior to any conclusion, to remaining overtly agnostic with respect to Polanyi’s definition of equivalencies and their determination.

The Appendix comprises a list of 157 attestations of the barley:silver price ratios extracted from the approximately 60-70000 transliterated Ur III administrative texts in the CDLI database. Each text ID is compiled from its Year Date, provenance, and text siglum. Access to the CDLI transliteration of each text identified can be had by following the hyperlink of each siglum. In some texts there is more than one occurrence of a price. Each occurrence is recorded in the list even if each has the same value. Multiple occurrences of a price in a text usually arise from several transactions and are therefore separate examples of the barley:silver ratios. Sometimes, the same text records different values from separate transactions.

About half of the 157 price ratios were also included in Snell’s table 6. “Grains” s.v. “še “grain” (Snell 1982: 138-143). Most of Snell’s entries in his table were recoverable from the CDLI database. A few could not be found and the additions to Snell’s list in the Appendix for the most part have been published since his book.

For want of a better terminology and pro tem, the column headed “unit” is the “unit of account”. “še-bi” in an entry denotes those transactions in which a transfer of silver has an associated (perhaps equivalent) value in barley, generically “n gin₂ ku₃(-babbar), še-bi n gur” as in Nisaba 07, 21 obv. 3-4. Conversely, “ku₃-bi” denotes those transactions in which a transfer of barley has an associated (perhaps equivalent) value in silver, thus “n še gur, ku₃ bi n gin₂”, see MVN 01, 240 obv (i) 8-9. In many interpretations in Sumerology, “še-bi” is thought of as the barley equivalent value

¹⁰ “... the golden rule throughout early Mesopotamian history was surely 1 gur of barley = 1 shekel of silver, which though not formalized in third-millennium decrees is implied by the majority of barley exchange (my emphasis) notations and by the evident interest of the crown in standardizing both metrological systems and barley wages...” (Englund: 2012a: 443). Powell (1990:92) also noted that the mean price of barley was close to 1 shekel per gur (300 sila₃) in Ur III texts, was a standard of value in the Laws of Ešnunna, and remained the standard calculation value in the OB mathematical texts. Snell (1982:142), on the other hand, showed that the median value in his data was 1 shekel of silver = 300 sila₃ of barley. The notion that it was a norm decreed by administrations may be more substantial than a mere assertion, although despite the Ešnunna Code, Snell (1982:185) demurred from the notion of a fixed ratio between barley and silver promulgated by the state “or sanctioned by tradition”.

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or barley price of silver and “ku₃-bi” as the silver equivalent value or silver price of barley. However, the notion of equivalent value is not readily apparent in very many examples particularly in silver loan documents. Snell (1982) used these terms to define “price” and in a more recent study of the monetary role of silver in Ur III Umma, Ouyang (2013:64) prefers to regard these price ratios simply as a conversion rate rather than a price on the probably dubious grounds that Snell (1982:189) found it difficult to set up a typology of Ur III texts that use various pricing formulae.

Nevertheless, “ku₃-bi” is customarily considered the pre-eminent unit of account or measure of equivalent value in exchanges of many different commodities recorded by the Ur III accounting system. In those employing a barley:silver ratio, however, this is clearly not so. Of the 157 occurrences listed in the Appendix, some 100 (64%) have “še-bi” as their unit of account and only 45(29%) “ku₃-bi”. The remaining 12 entries express the relationship of barley to silver as nig₂-sa₁₀-(am₁)-(bi) (3) or via a terminative (-šē₃) (2) or ablative/distributive (-ta) suffix (7). The column in the Appendix headed “ratio” converts all of these to values of n sila₃ of barley per shekel of silver.

Which way round the barley:silver ratio is expressed, whether as “n gin₂ ku₃-(babbar), še-bi n gur” or as “n šē gur, ku₃-bi n gin₂” may be a significant indicator of how barley and silver prices were determined. The first formulation occurs in transactions which indicate a payment in silver, while the second is in those which are indicative of a payment of barley. In his table 6 on grain (šē) prices, Snell, however, appears to consider both forms to be identical as an indicator of price in that all prices except for twelve different formulae given above are identified in his table only by the suffix –bi, which he defines as “silver, its value in (a product)...”, Snell (1982:120). The commodities in this present study are also še “barley or grain” and ku₃-(babbar) “silver”.

**A contextual typology of barley:silver price ratios**

It may be difficult to define a typology of texts based on various pricing formulae, but it is feasible to propose a classification of texts which helps to elucidate the structure of the barley:silver price ratios and perhaps leads to a better understanding of how they might have been determined. Texts from which these ratios can be calculated may be categorised as follows:

1. **Accounts of barley deliveries to institutional house holds.**
   (i). Collected summaries (Sammelurkunden) of deliveries of barley containing some silver payments in lieu of barley.

   (ii). the primary records of transactions which become summarised in the Sammelurkunden.

   Both groups of these texts have provenances almost entirely in Girsu.

2. **Accounts of barley expenditures by institutional households.**
   (i). Expenditures on the bala and other items, predominantly in records from Girsu.

   (ii). Expenditures via merchants/trade agents. These are primarily records from Umma with only one from Girsu.

3. **Loans and receipts of silver with repayments in barley**
   (i) Loan documents, mostly from Nippur and Umma but also from Girsu.

   (ii) Receipts. These may be related to loans but are not explicitly documented as such.

4. **Miscellaneous silver or barley disbursements with barley or silver equivalent**
Texts analysed in each of these categories are excerpted in seven tables below and the account type defined by each of the tables into which an occurrence of the barley:silver price ratio is assigned is incorporated in its list entry in the Appendix. A glossary of the Sumerian words and phrases used below to indicate these account types is included here to promote a fuller understanding of the tables.

**Glossary of Sumerian terms used in tables**

<table>
<thead>
<tr>
<th>Sumerian</th>
<th>English translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ab-ši-gar</td>
<td>“is being replaced”</td>
</tr>
<tr>
<td>a₂-g₂-e-dam</td>
<td>“it is to be measured out”</td>
</tr>
<tr>
<td>ba-an-ku₂</td>
<td>“it was entered/delivered”</td>
</tr>
<tr>
<td>bala  d₂-ság</td>
<td>“first (season) bala”</td>
</tr>
<tr>
<td>bala₂-bi 1₃-am₃</td>
<td>“its bala is 1”</td>
</tr>
<tr>
<td>buru₁₄</td>
<td>“harvest”</td>
</tr>
<tr>
<td>buru₁₄ ama-bi  gl₂-gl₄</td>
<td>“the harvest will remit this debt”</td>
</tr>
<tr>
<td>d₂-ság z₂-da-ke₂-ne</td>
<td>“scribes of the flour”</td>
</tr>
<tr>
<td>e₂-šăbra</td>
<td>“household of the major domos”</td>
</tr>
<tr>
<td>e₂-gir  buru₁₄</td>
<td>“after the harvest”</td>
</tr>
<tr>
<td>erinn₂</td>
<td>“workers”</td>
</tr>
<tr>
<td>gl₂-gl₂-dam</td>
<td>“it is to be returned”</td>
</tr>
<tr>
<td>g₂-nin PN</td>
<td>“via/under the authority of Person Name”</td>
</tr>
<tr>
<td>ka-guru₂</td>
<td>“granary supervisor”</td>
</tr>
<tr>
<td>ka₄</td>
<td>“messenger”</td>
</tr>
<tr>
<td>ki PN g₄-la₂-am₃</td>
<td>“it is located in the place of Person Name”</td>
</tr>
<tr>
<td>kikken₂</td>
<td>“(flour)mill/mill workers”</td>
</tr>
<tr>
<td>kišib₃</td>
<td>“seal”</td>
</tr>
<tr>
<td>kišib₃  dib-ba</td>
<td>“audited sealed document”</td>
</tr>
<tr>
<td>kislah</td>
<td>“threshing floor”</td>
</tr>
<tr>
<td>ki-su</td>
<td>“threshing floor”</td>
</tr>
<tr>
<td>ku₃ a₂  zi₂-KA nu₂-ar₃-ra</td>
<td>“silver of the labour of un-milled KA-flour”</td>
</tr>
<tr>
<td>ku₃-bi  n gin₂</td>
<td>“its silver # shekels”</td>
</tr>
<tr>
<td>l₃₂-ia₂</td>
<td>“deficit/arrears”</td>
</tr>
<tr>
<td>lu₂  lunga</td>
<td>“brewer”</td>
</tr>
<tr>
<td>lu₂-nig₂-dab₂₃</td>
<td>“storekeeper”</td>
</tr>
<tr>
<td>lu₂-ninim-ma₂-bi-me</td>
<td>“the witnesses”</td>
</tr>
<tr>
<td>mu lugal-bi in₃-pa₃</td>
<td>“he swore (an oath) on the name of the king”</td>
</tr>
<tr>
<td>mu PN-še₂₃</td>
<td>“on behalf of/for Person Name”</td>
</tr>
<tr>
<td>mu-ku₄(DU)</td>
<td>“delivery”</td>
</tr>
<tr>
<td>n gin₂ ku₃(-babbar)</td>
<td>“# shekels of silver”</td>
</tr>
<tr>
<td>n še gur</td>
<td>“# gur of barley”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak</td>
<td>“balanced account”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak ka₃-ra₂-a</td>
<td>“balanced account of the remainder”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak ninden</td>
<td>“balanced account concerning groats”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak PN dam-gar₃</td>
<td>“balanced account concerning Person Name, merchant”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak še u₁₃-tum</td>
<td>“balanced account of remaining barley deficits”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak še ur₃-ra kišib₃ dib-ba</td>
<td>“balanced account of loan barley and audited sealed documents”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak si₁₃-tum</td>
<td>“account of remaining deficits”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak zii KA</td>
<td>“balanced account concerning KA-flour”</td>
</tr>
<tr>
<td>nig₂-k₃-a₄-ak gana₂ u₁₃₄-a, PN</td>
<td>“balanced account of fields in cultivation (by) Person Name”</td>
</tr>
<tr>
<td>nig₂-s₃a₁₄-ams₁-bi</td>
<td>“its exchange”</td>
</tr>
<tr>
<td>nig₂-s₃a₁₄-ma</td>
<td>“purchases”</td>
</tr>
<tr>
<td>PN šu ba₂-li</td>
<td>“Person Name received”</td>
</tr>
<tr>
<td>š₃₁-dub₂-ba</td>
<td>“chief accountant”</td>
</tr>
<tr>
<td>š₃₂ ur₉₄-ma</td>
<td>“in the province of Ur”</td>
</tr>
<tr>
<td>š₂₃-ba₂-ta</td>
<td>“therefrom/out of it”</td>
</tr>
<tr>
<td>sag-nig₂-gur₁₁-ra₂-kam</td>
<td>“debits/available assets/capital” in a balanced account</td>
</tr>
</tbody>
</table>
| še                 | “barley”}
Table 1. nig₂-ka₉-ak si-i₃-tum with silver paid in lieu of barley delivery

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sīla₃ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nisaba 7, 7</td>
<td>nig₂-ka₉-ak si-i₃-tum, lu₂ nig₂-dab₃- ba kikken₂</td>
<td>la₂-ia₃, ša₃-bi-ta, n gir₂ ku₃, še-bi n gur, mu-ku₃(DU), su-ga mu-ku₃(DU), zi- ga, la₂-ia₃-am₃</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>HLC 091 (pl. 031)</td>
<td>nig₂-ka₉-ak si-i₃-tum, lu₂ nig₂-dab₃- ke₃-ne</td>
<td>si-i₃-tum, la₂-ia₃, ša₃-bi-ta, n gir₂ ku₃, še-bi n gur, PN šu ba-ti, mu-ku₃(DU), zi-ga, la₂-ia₃-am₃</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>MVN 8, 179</td>
<td>nig₂-ka₉-ak si-i₃-tum, lu₂ nig₂-dab₃- ke₃-ne ša₃ gir₂-su₃i</td>
<td>la₂-ia₃, ša₃-bi-ta, n gir₂ ku₃(-babbar), še-bi n gur, su-ga mu-</td>
<td>Girsu</td>
<td>317</td>
</tr>
</tbody>
</table>
Altogether, the barley deliveries are carried forward to the next accounting period. Most of the transactions:

- TUT 119: \textit{nig₂-ka₃-ak} si-i₃-tum, lu₂ nig₂-dab₂-ke₄-ne
  - \textit{la₂-ia₃, si-i₃-tum, ša₃-bi-ta, n gin₂, ku₃(-babbar), še-bi n gur, su-ga mu-ku₄(DU), la₂-ia₃-am₃}
  - Girsu 300

- CT 07, pl. 05-06, BM 012934: \textit{nig₂-ka₃-ak} si-i₃-tum še kin-ga₂
  - \textit{la₂-ia₃, ša₃-bi-ta, n gin₂ ku₃- babbar, še-bi n gur, su-ga su-ga mu-ku₄(DU), la₂-ia₃-am₃}
  - Girsu 300

- TIM 06, 02: \textit{[nig₂]-ka₃-ak} si-i₃-tum
  - \textit{la₂-ia₃, ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, su-ga mu-ku₄(DU), la₂-ia₃-am₃}
  - Girsu 307

- CT 09, pl. 44, BM 019038: \textit{nig₂-ka₃-ak} si-i₃-tum kilib₃-ba
  - \textit{ša₃-bi-ta, n gin₂ ku₃(-babbbar), še-bi n gur, z[i]ga, su-ga ugu₂-a gaa₂-gaa₂, zi-ga, la₂-ia₃-am₃}
  - Girsu 299

- MVN 12, 175: \textit{nig₂-ka₃-ak} si-i₃-tum kilib₃-ba
  - \textit{ša₃-bi-ta, n gin₂ ku₃(-babbbar), še-bi n gur, zi(ga), su-ga ugu₂-a gaa₂-gaa₂, ugu₂ PN ba-a-gar, la₂-ia₃}
  - Girsu 300

- Nisaba 07, 21: \textit{nig₂-ka₃-ak} si-i₃-tum
  - \textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, ensi₃-gal šu ba-ti, mu-ku₄(DU), la₂-ia₃}
  - Girsu 299

- Ontario 2, 442: si-i₃-tum, n gur, ki PN gal₂-la-am₃
  - \textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, mu-ku₄(DU)}
  - Umma 300

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila₃ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUT 119</td>
<td></td>
<td>\textit{la₂-ia₃, si-i₃-tum, ša₃-bi-ta, n gin₂, ku₃(-babbar), še-bi n gur, su-ga mu-ku₄(DU), la₂-ia₃-am₃}</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>CT 07, pl. 05-06, BM 012934</td>
<td></td>
<td>\textit{la₂-ia₃, ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, su-ga mu-ku₄(DU), la₂-ia₃-am₃}</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>TIM 06, 02</td>
<td></td>
<td>\textit{la₂-ia₃, ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, su-ga mu-ku₄(DU), la₂-ia₃-am₃}</td>
<td>Girsu</td>
<td>307</td>
</tr>
<tr>
<td>CT 09, pl. 44, BM 019038</td>
<td></td>
<td>\textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, z[i]ga, su-ga ugu₂-a gaa₂-gaa₂, zi-ga, la₂-ia₃-am₃}</td>
<td>Girsu</td>
<td>299</td>
</tr>
<tr>
<td>MVN 12, 175</td>
<td></td>
<td>\textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, zi(ga), su-ga ugu₂-a gaa₂-gaa₂, ugu₂ PN ba-a-gar, la₂-ia₃}</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>Nisaba 07, 21</td>
<td></td>
<td>\textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, ensi₃-gal šu ba-ti, mu-ku₄(DU), la₂-ia₃}</td>
<td>Girsu</td>
<td>299</td>
</tr>
<tr>
<td>Ontario 2, 442</td>
<td></td>
<td>\textit{ša₃-bi-ta, n gin₂ ku₃-babbar, še-bi n gur, mu-ku₄(DU)}</td>
<td>Umma</td>
<td>300</td>
</tr>
</tbody>
</table>

Most of the transactions collected in these texts register the delivery of barley to meet the amounts required by the institutions, either in whole or in part. Total arrears arising as a result of only part deliveries are carried forward to the next accounting period. However, and key to this study of the barley:silver price ratio is that several of the quotas and arrears are settled in whole or in part with payments of silver in lieu of barley. Often, to satisfy arrears, these payments of silver are combined with several deliveries of barley. An exemplary formulation is given in MVN 8, 179 rev. (v) 8-14.

8. 6 2(ban₂) 6/₃ sila₃ gur  “1826/₃ sila₃ of barley (probably in arrears)
9. ša₃-bi-ta therefrom (deduct from)
10. 5 gin₂ la₂ igi 6-gal₂ ku₃ 5 minus 1/₃ shekels of silver
11. še-bi 4 4(barig) 1(ban₂) gur its barley 1450 sila₃ of barley
12. 1 1(barig) 1(ban₂) 6/₃ sila₃ gur (and) 376/₃ sila₃ of barley
13. su-ga mu-ku₄(DU) replaced (with) delivery
14. sa₂-ti-tum Satium.”

The barley:silver price in this excerpt from MVN 8, 179 is 1 gur (300 sila₃) barley = 1 shekel silver. Altogether, five transactions are recorded in this text, the mean price ratio from which is 317 sila₃.
“litres” (1 gur 1 ban; 7 sila) to each shekel of silver. The barley:silver ratios from each of the individual transactions are set out in the Appendix. Three of the five price ratios are the supposed standard 1 gur = 1 shekel of silver. Eleven transactions which describe the payment of silver in lieu of the delivery of barley occur in Nisaba 7, 7, the mean ratio from which is 1 gur = 1 shekel since all the barley:silver prices are close to this standard value. The price ratios given for the summary accounts in Table 1 are all averages, with the exception of CT 07, pl. 05-06, BM 012934, in which text there is only a single transaction in silver. As before, the individual ratios for all occurrences of the ratios are given in the Appendix.

CT 09, pl. 44, BM 019038, a Girsu account dated Šulgi 47, differs from the other nig₂-kas-ak si-is-tum in this group not only in its lack of explicit credits of deliveries (mu-ku₃(DU)) to settle individual deficits, but also in its overall structure. It is more evidently structured as a “balanced account” similar in form to the more widely discussed “merchant” or “silver” accounts examined later. As in these and other balanced accounts all of the credits against the arrears brought forward are bracketed by ša₃-bi-ta........zi-ga, the difference between the credits and debits being the arrears carried forward to the next period. An analysis of this text may be constructed as follows.

Although the account is dated to Š 47, the principal quantity of barley arrears is carried forward from Š 43. The quantity of barley required to be delivered is subsequently added to by deficits in barley due from two named persons. These three quantities comprise the total “debts” in this account. From these are to be deducted the six payments enumerated a) to f). These in fact are defined as repayments (su-ga), three of which are made in silver in lieu of barley. These repayments are in the process of being debited to the account (su-ga ugu₂-a ga₂-ga₂), so too was the later debit to the account of a PN. This contrasts with the occasional charges or debits made to the accounts of PNs in other accounts of this genre listed in Table 1, where the debits have already been made. A comparable account also dated Šulgi 47 is MVN 12, 175.

<table>
<thead>
<tr>
<th>Grain: silver ratio</th>
<th>Litres barley</th>
<th>Litres barley</th>
<th>Litres barley</th>
<th>Litres barley</th>
</tr>
</thead>
<tbody>
<tr>
<td>barley b/f (si-is-tum) še mu en 3nanna (š) 43</td>
<td>328953.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>barley deficit from PN1</td>
<td>4745.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>barley deficit from PN2</td>
<td>7469.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total debits (deficit) payments to be deducted therefrom (ša₃-bi-ta)</td>
<td>341168.76</td>
<td>341168.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a). 2.84 shekels of silver in lieu of barley</td>
<td>850.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b). barley</td>
<td>10530.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c). 2.84 shekels of silver in lieu of barley</td>
<td>850.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d). barley</td>
<td>16705.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e). 37.57 shekels of silver in lieu of barley</td>
<td>11270.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f). barley repayments to be charged to the account (su-ga ugu₂-a ga₂-ga₂)</td>
<td>3226.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deduction (zi-ga) for field ritual to be charged (ugu₂-a ga₂-ga₂) to PN</td>
<td>43431.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total deduction (zi-ga)</td>
<td>336.00</td>
<td>780.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>remainder (la₂-las) c/f</td>
<td>44547.16</td>
<td>44547.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>296621.6</td>
</tr>
</tbody>
</table>
The subscriptions to several of the texts in Table 1 indicate accounts kept of the activities of officials engaged in different functions of the provincial government. Two thirds of the line refers to the storekeepers’ role as officials of the provincial administration. Other texts are both explicit about the storekeeper occupation of the lu2 narg-dab3-ke1-ne and in which the subscription of line refers to the account of the storekeepers of the remainder of harvested barley.”

11 The meaning of the term lu2 narg-dab3-ke1-ne has varied with context between “conscripts”, “requisitioners” and “storekeepers”. lu2 narg-dab3-ugnim was considered to be a member of a specific category of recruited men in a military establishment (an army?) by Lafont (2009:4) in interpretation of a Girsu text CT 10, pl. 45, BM 021394 obv. 13. Since the reverse of the tablet records the storage of barley under the seal of lu2 narg-dab3-ke1-ne, these men were probably storekeepers of the army. Although Sallaberger (2003:49 fn. 205) substantiated the interpretation “Magazinverwalter”, he also differentiated a special meaning of “persons who appropriated cattle for offerings”, applicable to the Puzri-Dagan texts in his study.

It is evident, though, that in Girsu, lu2 narg-dab3-ke1-ne were officials of the provincial government who operated as storekeepers in a variety of environments. More than a dozen texts attest to kišib1, lu2 narg-dab3-ke1-ne and objects “under the seal of the storekeepers”. PPAC 5, 0199 is a tag from a sealed basket of tablets, kišib1, lu2 narg-dab3-ensibka-ne “under the seal of the storekeepers of the governor”, which emphasizes the role of the storekeepers as officials of the provincial administration. Other texts are both explicit about the storekeeper occupation of the lu2 narg-dab3-ke1-ne and of their position as officials of the governing institutions. The subscription of PPAC 5, 0310 at rev. (ii) 20-22 totals the sealed allocations of quantities of barley by a list of individuals as šu narg1 1 guru [...], kišib1, lu2 narg-dab3-ke1-ne, e2-kišib3-ba-ta, “1080000+ litres [barley], under the seals of the storekeepers, from the store of sealed commodities”. TEL 204 is subscribed gaba-ri kišib1, lu2 narg-dab3, sukkal-mah-ke1-ne, e2-kišib3-ba-ta, lu2-ma2-gu-la šu ba-ti “Lumagula received a copy of the seal of the storekeeper of the chief minister from the store of the sealed commodities”.

In addition to Lafont’s identification of their role as storekeepers in the military of Girsu, the lu2 narg-dab3-ke1-ne were also occupied in other areas of the provincial administration. They were officials of the threshing floor, lu2 narg-dab3-ki-[su]-ra-ke1 in CM 26, 071, and in Nisaba 7, 7 a nig2-ka2-ak si-i-tum of table 1 above, they are storekeepers in the e2-kišib3 “mill (house)”. 12 KIN here is understood as synonymous with gur1 ešida “to harvest” (Civil 1994:169-70). še kin-ga2 was stored in an e2 kin-ga2 which is probably another word for “grain store”, as established by a fragmentary Girsu text dated Su-Suen 7, TEL 173. Part of the obverse of this fragment reads:

1. 5 1(barig) še gur 1560 litres of barley
2. še e2-kišib3-ba barley of the sealed store
3. (barig) 4(ban) še e2-kin-ga2 160 litres barley of the grain store
4. ša3 pu2 šu-i-ne in the irrigated orchard of the barbers
5. 1 1(ban) 5 sila3 še e2-kišib3-ba 315 litres barley of the sealed store
6. (barig) 1(ban) 5 sila3 še nig2-ar3-ra 195 litres of barley granots
7. še e2-kin-ga2 barley of the grain store
8. ša3 irrigated place of e2-šišimmar du3-a in the planted date palms

The co-occurrence of e2-kišib3-ba and e2-kin-ga2 in this text suggests a semantic relationship between the two terms for “store house”; one kind of store is sealed and one isn’t. It is also evident from the reverse of the fragment that these stores are probably in the ownership of some part of the governing administration, since the barley is received from the stores under the seal of ur-mes, a šabra in the royal or a temple household. The location of this particular e2-kin-ga2 at the “orchard of the barbers” is probably also attested in the sealed document, also dated Su-Suen 7, MVN 02, 074 rev. 1. 1 s dubbed pu2 šu-i-ne-ta “from the grain store of the irrigated orchard of the barbers” from which barley rations are distributed to workers; and in the subscript of BM Messenger 337 where guruš and eri2-tur are
Accounts listed in Table 1, with the exception of CT 09, pl. 44, BM 019038, are each a collection of summarised accounts of individual “primary” transactions, an example of which may be provided by Nisaba 07, 21. This text could equally well have been included in Table 2, but has been retained in Table 1 in deference to its subscript nig₂-ka₇-ak si-i₃-tum.

Nisaba 07, 21 dated Šulgi 39 reads:

obverse
1. 3 4(barig) 3(ban₂) 8(disz) sila₃ gur lugal
2. ša₃-bi-ta
3. 2 gin₃ la₂ 5 1⁄₂ še ku₃-babbar
4. še-bi 1 4(barig) 5(ban₂) gur
5. ba-zi ensi₂-gal šu ba-ti
6. mu-ku₃(DU)
7. la₂-la₃ 1 4(barig) 4(ban₂) 8 sila₃ gur

reverse
1. giri₃ ba-zi
2. nig₂-ka₃-ak si-i₃-tum
3. da-ti-mu
4. mu PU₃,ŠA₃-i₃-ga-dan ba-du₃

“1178 sila₃ of barley in the royal measure therefrom (deduct from) 2 shekels minus ½ grains of silver its barley 590 sila₃ (silver which) Bazi, ensi₂-gal, received delivery.
arrears 588 sila₃ of barley via Bazi
the account of the remaining deficit (of) Datimu
Year the temple of Puzriš-Dagan was built (Š 39)

In this text the silver payment replaces barley at a ratio of 299 sila₃ per shekel. The ensi₂-gal, Bazi, received the payment of silver, presumably from Datimu, and also authorised the carrying forward of his arrears of barley. Datimu may be the scribe in MVN 02, 192 obv. 10 a text from Šulgi 40, a year later than this account, although we cannot guess that he acts in the capacity of scribe here.

These accounts of individuals could also be in surplus as well as arrears. Thus MVN 9, 96 is perhaps one of these and reads:

obverse
1. 4(barig) 2(ban₂) 5 sila₃ še lugal
2. ša₃-bi-ta
3. 1 gin₃ ku₃-babbar
4. še-bi 1 gur
5. na-silim dumu ur-nig₂-palil šu ba-ti
6. mu-ku₃(DU)
7. diri 3(ban₂) 5 sila₃ še

reverse
1. giri₃ ga-sa₆-ga
2. nig₂-ka₃-ak
3. iri₁₂-bi dumu ur-₃-utu ma₃₂-lah₃₁
4. mu us₂₂-sa bad₃ ma-da ba-du₃

“265 sila₃ barley by the royal measure therefrom (deduct from) 1 shekel of silver its barley 300 sila₃ Nasilim son of Urnig-palil received delivery surplus: 35 sila₃ of barley
via Gasaga
blank
the account of
Iribi son of Ur-utu sailor.
The year after the wall of the land was built (Š 40).

remunerated with barley i₃-dub pu₂ šu-i-ka-ta “from the grain store of the irrigated orchard [pu₂ (₃̄₃ki₃₃)] of the barbers” by a royal overseer (nu-band₃₃ lugal). It is reasonable to assume therefore that e₂-kišš₃-ba, e₂-kin-ga₂ and i₃-dub are semantically cognate.

13 ur₃-lamma was ensi₂ of Giršu at this time. The meaning of ensi₂-gal is unclear therefore, although it surely denotes the profession of a state official, but see CDLI Seals 005843 (composite) where a Bazi, is the scribe and son of Nasilim on a seal with Ur-Lamma the governor of the Lagāš province. Translations of “great/chief governor” or “former governor” don’t seem to fit the context.
In this instance more silver was paid in lieu of the barley than the amount due required. It may be that Naslim deemed the amount due to be 1 gur and therefore the standard value of 1 shekel of silver was sought in lieu of barley, though clearly the makers of the account did not consider it so. In CT 07, pl.46, BM 017774 ga-sa-ša-ša is a cook (muhaldim), while na-silim has a seal, both of whom, since they appear together, may be identified with the same two persons named here.

*nig₂-ša₂-ak PN with silver paid in lieu of barley delivery*

The second group of texts which account for quantities of barley to various functions within provincial administrations (again primarily that of Girsu) are labelled as accounts concerning individual persons who were probably officials responsible for the administration of some function or other in the governing institutions of the province. Table 2 provides an overview of these texts. Although they suggest that an individual as opposed to some general office were accounted, some of the accounts summarised several transactions, while the remaining texts describe a single transaction only. The institutional context of these texts may prima facie be indicated in Table 2 by the subscripts to HSS 4, 24 and MVN 6, 507. The first is subscribed as the account of an overseer of a mill/mill workers and the second as that of the member of the household of an official administrator (šabra “major domo”).

### Table 2. nig₂-ša₂-ak PN with silver paid in lieu of barley delivery

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila; barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 07, pl.46, BM 017774</td>
<td>nig₂-ša₂-ak PN</td>
<td>n gin₂, ku₂-babbar; še-bi n gur, si-i₂-tum nig₂-ša₂-ak, ša₂-bi-ta, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>CT 10, pl.44, BM 018962</td>
<td>nig₂-ša₂-ak PN</td>
<td>si-i₂-tum, ša₂-bi-ta, n gin₂, ku₂, še-bi n gur, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>240</td>
</tr>
<tr>
<td>HSS 4, 24</td>
<td>nig₂-ša₂-ak PN ugula kikken₂</td>
<td>si-i₂-tum, ša₂-bi-ta, n gin₂, ku₂(-babbar), še-bi n gur, ugu₂ PN ka-guru; ba-a-gar mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>271</td>
</tr>
<tr>
<td>MVN 6, 507</td>
<td>nig₂-ša₂-ak PN e₂-šabra</td>
<td>ša₂-bi-ta, n gin₂, ku₂, še-bi n gur, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>Nisaba 13, 54</td>
<td>nig₂-ša₂-ak PN</td>
<td>ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi n gur, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>TLB 03, 150</td>
<td>nig₂-ša₂-ak PN</td>
<td>si-i₂-tum, ša₂-bi-ta, n gin₂, ku₂, še-bi n gur, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>Nisaba 13, 53</td>
<td>nig₂-ša₂-ak PN lu₂-lunga</td>
<td>ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi n gur, mu-ku₂(DU)</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>MVN 9, 96</td>
<td>nig₂-ša₂-ak PN</td>
<td>ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi n gur, mu-ku₂(DU), diri</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>Nisaba 18, 95</td>
<td>nig₂-ša₂-ak PN</td>
<td>ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi n gur, mu-ku₂(DU)</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>HLC 39 (pl. 70)</td>
<td>nig₂-ša₂-ak gir₃ PN</td>
<td>si-i₂-tum, ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi n gur, ugu₂ PN ba-a-gar, mu-ku₂(DU), la₂-i₂</td>
<td>Girsu</td>
<td>240</td>
</tr>
<tr>
<td>HLC 270 pl.125</td>
<td>nig₂-ša₂-ak PN</td>
<td>ša₂-bi-ta, n gin₂, ku₂-babbar, še-bi</td>
<td>Girsu</td>
<td>240</td>
</tr>
</tbody>
</table>
between Šulgi 34 and 43. However nig bas-lat, n gur, ku2-babbar, še-bi n gur, mu-
ku(DU), la2-ia3

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean silica barley per shekel silver</th>
</tr>
</thead>
</table>
| MVN 11, 76 | nig2-kas-ak PN | n gur, mu-
kuri(DU), la2-ia3 | Girsu | 300 |
| PPAC 5, 707 | gnir PN, date | si-i-tum n gur ku2-babbar, še-bi n gur, mu-
kuri(DU), [ugu]PN ba-[a]-gar | Girsu | 333 |

In **HSS 4, 24**, balances of barley owing (si-i-tum) from two separate years totalling 18817 litres are the responsibility of (gni) two officials, Gudea and Nigurum. Set against these deficits are firstly a quantity of barley and a payment of silver in lieu of barley received by Nigurum and secondly several deliveries of barley including a second payment of silver in lieu together with a quantity of barley debited to the account of a granary supervisor. These total some 15522 litres of barley including the barley equivalents of the silver payments. This total amount of barley is to be replaced (su-su-dam) via Gudea and Nigurum and is recorded as a delivery. The account is made in respect of ur-nig2 ugula kikken “Urnig the overseer of mill-workers”. The barley deficit was probably owed to the mill therefore. The account was apparently established in Šulgi 37, but dates settlements of the account and particularly the silver payments to the later years of Šulgi 42 and 43. It may be that these silver payments were required once barley due was deemed to be not forthcoming. Both of the other accounts with several transactions, **CT 07, pl.46, BM 017774** and **MVN 6, 507**, suggest a similar process.

**TLB 03, 150** is paradigmatic of the more numerous texts where only one transaction delivered barley and silver in lieu of barley in part defrayal of a barley deficit. Its explanatory qualities merit a more detailed examination, hence the transliteration and translation of the short text included here.

<table>
<thead>
<tr>
<th>obverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 38 2(barig) 4(banu) še gur lugal gur</td>
</tr>
<tr>
<td>2. si-i-tum mu us2-sa bad3 ma-da ba-du3</td>
</tr>
</tbody>
</table>

“11560 silica of barley measured with the royal land was built (§ 38)
therefrom (deduct from):
3370 silica of barley
(and) 19 shekels and 20 minus 2 grains of silver
its barley 5730 silica
Urbaba received delivery
the year the en-priestess of Nanna was chosen by extispicy (§ 43)
blank space
total: 9100 silica of barley.

---

14 gni-de-a is possibly gni-de-a ša2-si-dub-ba “Gudea, chief accountant” in six texts dated between § 31 and IS 1, although 34 years as an official seems overlong. The seal of **TLB 03, 157-158** dated to AS 7 reads gni-de-a ša1-si-dub-ba giri-su[8] clarifying the position of Gudea as an official of the provincial administration in a role most likely to be involved in these transactions. Alternatively, but perhaps less likely Gudea may be identifiable with gni-de-a ab-ba iri “Gudea, the city elder” an official in nine texts with dates approximately contemporary with **HSS 4, 24** i.e. all dated between Šulgi 34 and 43. However nig2-u2-rum does not appear in any other texts with him, although he must be acting here in an official capacity.
The account held by the official Lu-Ušgina records a barley deficit of some 11560 litres in the year Šulgi 38. A second official, Urbaba, is to replace this with barley plus a payment of silver in lieu of barley he has received as a delivery in the year S 43. The silver is equivalent to 5730 litres of barley. The total delivery of 9100 litres of barley (actual barley plus silver equivalent) still leaves a deficit of 2460 litres remaining from the original deficit of 11560 litres. The delivery plus the remaining deficit are to be replaced in Lu-Ušgina’s account via Urbaba. Interestingly, the date of the receipt of barley together with the silver payment by Urbaba is apparently some five years after the beginning date of the account, perhaps indicating that silver was paid in lieu after several years of failure to deliver a required quantity of barley. Significantly, the barley:silver ratio used to convert the silver payment to barley in this instance is 300 sila to 1 gin₂ silver.

2. Accounts of barley expenditures by institutional households

Expenditure on the bala and other items

A distinguishing characteristic of the texts listed in tables 1 and 2 is the formulary common to each group. There are two exceptions identified in table 1 (CT 09, pl. 44, BM 019038 and MVN 12, 175). Nonetheless the essential structure of their syntax, “si-i₃-tum, ša₃-bi-ta...................mu-ku₃, (DU), la₂-ia₁/diri”, indicates that deliveries of barley were set off against deficits from a previous period to leave either a remaining deficit or a surplus.

Although two of them are balanced accounts of remaining deficits (niġ₂-ka₃/ak si-i₃-tum) of barley, all of the accounts in table 3 on the other hand primarily deal with the expenditure by provincial institutions of probable barley surpluses. They do not describe deliveries (mu-ku₃, (DU)) of barley or silver in lieu into these institutions to offset the deficits of barley. Elaborations of their structure aside, the overriding syntax of these particular balanced accounts ((sag-niġ₂-gur₁₁-ra-kam), ša₃-bi-ta...................zi₃-ga₃-am₃) indicates expenditure from “capital” or “available assets” of barley - often translated less definitively as the debits. The phrase sag-niġ₂-gur₁₁-ra-kam is amissible in the Ur III balanced accounts. Traditionally, “capital” seems to be most frequently used in the context of the merchant accounts. Whether or not the Sumerians would have regarded the goods totalled at the head of these accounts and often termed sag-niġ₂-gur₁₁-ra-kam as “capital”, or simply as an accumulation of stored barley to be expended or otherwise distributed is moot. The etymology of the term could perhaps stem from the agricultural processes of an agrarian economy where the gur₁₁ sign in the phrase is synonymous with guru₃ “grain heap” or “store”. sag-niġ₂-gur₁₁-ra-kam is probably related to e₂-niġ₂-gur₁₁-ra “storehouse or treasury” which is attested from ED IIIb through the Old Babylonian periods, though not in administrative texts after the Old Akkadian. ¹⁷

¹⁵ ur₃-ba-b₃₉, dumu ur₃-sa₃-ga was almost certainly a state official and also son of an official at around the time indicated by the dates in this text. In the year Š 39 ur₃-sa₃-ga was a nu-band₃₉ (see TUT 130 obv. 5.). In Š 42 ur₃-ba-b₃₉ was a scribe. The seal on the envelope Nisaba 18, 002 reads ur₃-ba-b₃₉, dub-sar, dumu ur₃-sa₃-ga₃, [nu-band₃₉] gu₃-ta₃. [la₉].

¹⁶ In TCTI 2, 03956 lu₂-ur₃-gi-na dumu ka₃-a-mu is a scribe and therefore an official of the state or provincial administration. However, that text is dated Amar-Suen 8, some 13 years after the latest date in TLB 03, 150. Nevertheless, lu₂-ur₃-gi-na dub-sar, dumu ka₃-a-mu appears in some 18 seals and texts between AS 8 and IS 3. ka₃-a-mu is also a scribe in Ginsu texts which range in date from late in the reign of Šulgi to the middle of Šu-Suen.

¹⁷ Dahl (2010:277-8), on the other hand, suggests that the terminology used in the balanced accounts is best understood as simply relating to the physical structure of the document, rather than the nature of the goods. Thus, sag-niģ₂-gur₁₁-ra-kam is “loose” translated as “the first section of the account”, while the second is initiated by ša₁-bi-ta meaning “from its middle” and terminated by zi₀-ga₀₃ “torn/booked out”. If the value (as expressed by...
Table 3. Expenditures from barley assets on the bala and other

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila₄ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 07, pl 21, BM 13165</td>
<td>nig₂-ka₂-ak PN</td>
<td>sag-nig₂-gur₂-ra-kam, ša₂-bi₂-ta, ugu₂-a ga₂-ga₂, n gin₂ ku₂-babbar, še-bi n gur, zi-ga, dir.</td>
<td>Girsu</td>
<td>240</td>
</tr>
<tr>
<td>ASJ 13, 230 74</td>
<td>nig₂-ka₂-ak, gana₂ uru₂-a, PN</td>
<td>sag-nig₂-gur₂-ra-kam, ša₂-bi₂-ta, n ku₂, še-bi n gur, šišib₂ ensi₂, zi-ga, la₂-ia₂.</td>
<td>Girsu</td>
<td>240</td>
</tr>
<tr>
<td>CTNMC 53</td>
<td>nig₂-ka₂-ak še si₁-tum, ka₂-guru₂, u₂ dub-sar zi₂-da-ke₂-ne</td>
<td>si₁-tum, sag-nig₂-gur₂-ra-kam, ša₂-bi₂-ta, n gin₂ ku₂-babbar, še-bi n gur, e₂-gal₂-la ba₂-an₂-ku₂, ūše₂-ru₂-ša₂-ži₂-ša₂-ba₂-ga₂, ūšu₂-a ga₂-ga₂, zi₂-ga, la₂-ia₂-am₂.</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>CT 1, pl 04-05, BM 17744</td>
<td>nig₂-ka₂-ak si₁-tum še sumun, nig₂-ka₂-ak ka-la₂-a PN ensi₂</td>
<td>sag-nig₂-gur₂-ra-kam, ša₂-bi₂-ta, ugu₂-a Prof N ba₂-a-gar, n gin₂ ku₂-babbar, še-bi n gur, ugu₂-a ga₂-ga₂, zi₂-ga, šum₂-mu₂-dam₂, la₂-ia₂, am₂.</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>HLC 81 (pl 32)</td>
<td>nig₂-ka₂-ak PN dub-sar zi₂-da₂, bala₂-dub₂-sag.</td>
<td>si₁-tum nig₂-ka₂-ak, sag-nig₂-gur₂-ra-kam, ša₂-bi₂-ta, zi₂-ga₂-lugal₂, ugu₂-a PN ba₂-a-gar, ugu₂-a ga₂-ga₂, n gin₂ ku₂, še-bi n gur, zi₂-ga, la₂-ia₂.</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>CM 26, 143</td>
<td>[nig₂]-ka₂-ak PN, bala₂-bi₂ 1-am₂</td>
<td>si₁-tum bala₂-dub₂-sag, ša₂-bi₂-ta, n gin₂ ku₂-babbar, še-bi n gur, la₂-ia₂, su₂-ga₂, zi₂-ga₂-am₂, ugu₂-a ga₂-ga₂.</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>KM 89534</td>
<td>nig₂-ka₂-ak ninda PN bala₂-bi₂ 1-am₂</td>
<td>nig₂-ka₂-zi₂-ga, sag-nig₂-gur₂-ra-kam ša₂-bi₂-ta.</td>
<td>Girsu</td>
<td>300</td>
</tr>
</tbody>
</table>

equivalences) of the second section was larger than the first, a “surplus” (diri) resulted. If smaller, the result was a “deficit” (la₂-ia₂). Despite the simplification, Dahl follows Englund (1990) in considering that the merchant accounts “calculated the rate at which the trade agent converted the “goods”, put at his disposition by certain agencies of the state, into commodities sought by the same or other agencies of the state”. The italics are my emphasis to highlight that these are the sag-nig₂-gur₂-ra-kam, and which therefore relate to the nature of the goods supplied by the state. Indeed, Steinkeller (2003:53-4) is unequivocal that the “merchant balanced accounts” were standing accounts into which the “fiscal office” of the Ur III government funnelled bulk capital (i.e. sag-nig₂-gur₂-ra-kam) in the form of grain, silver and wool which financed independently made withdrawals (zi₂-ga₂-am₂) of goods required by various government institutions from merchants’ stores. The structure of the balanced accounts may be readily generalised even though applied to diverse activities in the Ur III economy as it “was similar in most cases: the balance carried over from a former balanced account, plus new items …made available during the period …, constituted the debits section; the next section included the expenditures credited to the person to whom the balanced account belonged; then followed the comparison between the preceding totals and the report of a positive or negative balance; and the document usually finished by recording the dates to which the balanced account applied and the name of the person or organization involved.” (Moliña 2016: §38). Even so, the nature and valuation (price determination) of the so-called “capital” items in the merchant accounts remains a particular issue.
from this text, however, as to why he received a payment of silver in lieu of barley, if that was the case.

Thus the Ur III state mainly represented a n... it may even be contradicted by similar to the scheme of temples and bureaus for the administration of Umma put forward by Snell (1982:77).

... the provision of the main temples and lesser temples and shrines led by a chief priest and administered by the secular sanga and his subordinates the šabra. The palace and the temples had sections devoted to agricultural production, animal husbandry, craft industries and administration (de Maaijer 1998:53).

Sharlach’s reconstruction is conceptually similar to the scheme of temples and bureaus for the administration of Umma put forward by Snell (1982:77). However, as Steinkeller himself noted, the existence of these secular institutions is implied rather than explicit. Indeed, it may even be contradicted by YOS 4, 237 which shows that in Umma, the flocks of sheep owned by the ensi2 were held by the temples of the province. The Umma temples thus managed the subsistence economy of farming and animal husbandry. “In this way, the economy of Sumer remained stable despite political changes and turmoil(lu)”, Thus the Ur III state mainly represented a new overlying structure, which despite its general influence left the base intact” (Sallaberger 2014:105).

18 In the Ur III state and possibly differently from Umma, where the provincial government may have been exercised from a series of bureaus, the government of Lagâš probably operated via temple households, especially to administer agricultural land on behalf of the provincial administration (Sharlach 2004:63). The administration of Lagâš was headed by the ets-gal “palace” under the authority of the ensi1 “governor” responsible to whom were households consisting of the main temples and lesser temples and shrines led by a chief priest and administered by the secular sanga and his subordinates the šabra. The palace and the temples had sections devoted to agricultural production, animal husbandry, craft industries and administration (de Maaijer 1998:53–4). The organisation of Umma on the other hand is seen by Steinkeller (2003: 41–2) and followed by Sharlach, as somewhat different. As in Lagâš the governor was the administrative head of the province, “under whom were the temple households and various offices responsible for running different branches of the Umma economy”. The most influential of the latter was the fiscal office, but there was also an agricultural office, a grain office, a labour office, an animal office in charge of cattle, sheep and goats, a wool office, a leather office, a metals office, a boat office and a forest sector. Steinkeller’s reconstruction is conceptually similar to the scheme of temples and bureaus for the administration of Umma put forward by Snell (1982:77). However, as Steinkeller himself noted, the existence of these secular institutions is implied rather than explicit. Indeed, it may even be contradicted by YOS 4, 237 which shows that in Umma, the flocks of sheep owned by the ensi2 were held by the temples of the province. The Umma temples thus managed the subsistence economy of farming and animal husbandry. “In this way, the economy of Sumer remained stable despite political changes and turmoil(lu).” Thus the Ur III state mainly represented a new overlying structure, which despite its general influence left the base intact” (Sallaberger 2014:105).

19 ur-sa2-qa nu-bandâ1 gu-za-ia2 appears in some eight Girsu texts between Š31 and Š40. It is most probable therefore that ur-sa2-qa nu-bandâ1 in this text dated to Š40 is the same person and thus an official of the ensi2. It is not apparent from this text, however, as to why he received a payment of silver in lieu of barley, if that was the case.
total of barley expended (zi-ga) amounts to 857 gur + 4 barig + 1 ban, including the barley equivalent of the silver received by ur-sa×-ga. This level of expenditure exceeds the sag-nig-gur, ra-kam by 1 ban, which is the dišu.

ASJ 13, 230 74 is a Girsu “seed and fodder” text for the demesne fields managed by ur-lamma
dumu nam-mah (Maekawa 1991:211). It is formulated as a balanced account and is subscribed nig, -ka, gan, ur, -lamma, du, nam-mah “balanced account of fields in cultivation by Ur-Lamma, son of Nammah”. Barley “assets” (sag-nig-gur, ra-kam) from various sources are disbursed to seed both the fields in cultivation (gan, ur, a) and other fields in rotation (gan, bala-a), the latter being brought into cultivation from the fallow. The barley to remunerate hired labour (a hun-ga) to seed these fields is also counted among the expenditure as is barley redistributed as rations to the cultivator’s agricultural workers (še šuku, ur). In addition to these barley expenditures, 60 shekels of silver is received by the governor (kišib ensi) for which barley at the rate of 240 sīla per shekel of silver, in total 48 gur, is expended and debited to the account. What this payment of silver to the ensi is in respect of, is not immediately obvious. A possible explanation is that it represents the silver portion of a rental payment for land leased from the state demesne managed by ur-lamma. Such payments were required to be partly in silver and partly in barley (de Maaijer 1998:57).

CTNM 53 is defined by its subscript as an account of barley remaining (nig, -ka, ak še si-šu-tum) in the management of the granary supervisors and scribes of the flour. The account records the institutional expenditure of barley “assets” (sag-nig-gur, ra-kam) for a variety of purposes (zi-ga didi inim gu, -de-a ša, -dub-ba-ta “various expenditures under the instructions of Gudea, the chief accountant”) and via a variety of personnel. Three only of the many expenditures/withdrawals involve a transfer of silver and record its barley equivalent (še-bi). The first of these is a transfer of one and a half mina plus one shekel of silver in lieu of barley together with 60 gur and three barig of barley to Uršugalamma, a šabra (major domo) of a temple. The barley:silver ratio in this transfer is 300 sīla per shekel. The institutional household in Girsu of which Uršugalamma was šabra at the time of Šulgi may have been the palace, ešul-gi “the household of Šulgi”, though since the household is also attested throughout the reign of Āmar-Suen, it was more likely to be a temple.20 The combined payment of silver and barley to a šabra is also suggestive of a field rental payment. The two other transfers of silver recorded and which involve an expenditure (zi-ga) of barley are on the face of it quite different. Perhaps uniquely in these Girsu texts, barley may have been directly exchanged to acquire large amounts of silver currency. In this particular instance, and if so, it is possible to think of the barley:silver price ratio as a barley price of silver.

CTNM 53 obverse (ii) 17-22 reads/ 1gu, 3 2/1, ma-na 7gin, 2/3 (NINDA1xŠE.2) 12 še ku, babbar/ še-bi 1guru, 227 3(barig) 4(ban), gur/ eš-gal-la ba-an-ku, (KWU147)/ girî, šeš-kal-la/ du, um, 4-baba, “3827.73 shekels of silver, its barley 1148320 sīla, were delivered into the palace via Šeškala, son of Urbaba”. The barley:silver price ratio here is also 300 sīla per shekel. This transaction is dated to Š 33.

CTNM 53 obverse (iii) 17-20 record a second smaller delivery of silver into the palace also subject to a similar exchange with barley via Šeškala. This is dated to Š 34 and in this transaction 81055

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20 ASJ S. 004 depicts the annual allocation of threshed barley primarily to officials of temple households grouped under the šabra of each household in an account of threshed barley of temple households and their managers (še geš ra sanga šabra-ne). Heading each list of barley allocations is a distribution to the šabra. The group at rev. (ii) 9-11 is headed ur-su, ga-lam, ma, esul-gi, 40 (gur) šabra. The date of the text is AS 2 which is somewhat later than CTNM 33. Nevertheless, ur-su, ga-lam, ma is associated with the household of Šulgi in texts throughout the period from Š 33 to AS 9. Most if not all of the households listed in ASJ S. 004 are temples, which suggests that esul-gi was a temple also.

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5/6 sila₃ of barley are exchanged for 270 shekels of silver, so that the barley:silver “price” ratio is again 300 sila₃ per shekel.

šēš-ka-la dumu ur⁻ba-ba₄ was probably a scribe, and thus an official of the provincial administration, identifiable from the seals in MVN 11, 044 and PPAC 5, 1559 both of which are also from the late Sulgi period (§ 46 and § 48 respectively). In both of these texts, distributions of barley, in the first instance via a barley loan, are authorised under his seal. Further confirmation of his association with some of the activities described in CTNMC 53 may be given by MVN 07, 534 and ASI 03, 158 122. The subscripts in CTNMC 53 rev. 11-12, nig₂-ka₃-ak še si-i₃-tum // ka-guru₁₁ u₃ dub-sar zii-da-ke₃-ne, could even be one of the tablets in the tablet store of which MVN 07, 534 is the undated pisan-dub-ba. This basket of tablets contained accounts charged to the granary administrators and kišib₁ šeš-kal-la dumu ur⁻ba-ba₄ is under the seal of Šēskala son of Ur-Baba”. ASI 03, 158 122 suggests that in § 44 šeš-kal-la dumu ur⁻ba-ba₄ may be the subordinate of the unguila of a grain store/silo (i₁-dub).

In all, CTNMC 53 records that a large quantity of silver was delivered to the e₂-gal in exchange for an equally large volume of barley. That the silver of (ii) obv. 17 has been acquired with a disbursement of barley is evidenced by the fact that še-bi 1guru₂ 227 3(barig) 4(ban) gur of (ii) obv. 18, is paralleled by obv. (iii) 14, šu-nigin₁ 1guru₂ 227 3(barig) 4(ban) gur še ku₃ “Total: 1148320 sila₃ barley for silver”. Similarly, it is certain that the še-bi 270 5(ban) 5 5/₆ sila₃ gur of obv. (iii) 18 enables obv. (iii) 23 to be restored as šu-nigin₂ 270 5(ban) 5 5/₆ sila₃ gur [še ku₃]. A reasonable reconstruction would suggest that the barley disbursed from a granary, perhaps administered on behalf of the province by a Girsu temple, was actually exchanged for silver to be delivered by Šēskalla to the provincial governor, the ensi₂ of Lagas, whose administration resided in the e₂-gal. In all, in this one text, some 4108 shekels of silver were delivered to the e₂-gal via Šēskalla in the two years of § 33 and 34.

CTNMC 53 is structured so that after expenditure is totalled and deducted from the sag-nig₂-gur₁₁-ra-kam a substantial amount of barley remains unspent. This remainder is then appropriated in three ways. A proportion of the debit (“capital”) is set aside to be investigated/checked (ugu₂-e-tak₃-a e₁₁-bi tar-re-dam); a large quantity of barley is assigned as loan barley in “sealed document of extended debt repayment periods” (še ur₁-ra kišib₃ gid₂-da). A proportion of the remainder of the unspent barley is allotted to scribes of the flour and Uršugalamma, the šabra. The final remainder (la₂-ia₃) is then carried forward in the account of the granary supervisors and the flour scribes.

In CT 1, pl.04-05, BM 17744, nam-mah dumu ur⁻gigir, probably an official of temple or state, has received nearly six mina of silver, seemingly in lieu of barley, from the expenditure of sag-nig₂-gur₁₁-ra-kam which is composed mainly of the remaining balance of loan barley and barley from a granary (i₁-dub). The barley:silver ratio is again 300 sila₃ per shekel. The silver so received is to be debited to his account. The great majority of the expenditure in the account is of barley, a major part of which was debited to the account of a šabra “major domo” of a sanga “temple administrator”. The balanced account is a remainder account (nig₂-ka₃-ak ka-la₂-a) of ur⁻lamma, the ensi₂ of Lagaš dated § 35.

Loan barley (še ur₁-ra) with and without interest added, deficits of barley not yet issued as loans (la₂-ia₃ še ur₁-ra nu-ta-e₁₁-a) and arrears of barley registered in audited sealed documents (la₂-ia₃

²¹ 3 gur: 4(geš₃u) 7(geš₃j) 14 3(barig) 2(ban) 7 5/₆ sila₃ gur.

²² For this possible interpretation of this phrase see the discussion by Wilcke (2006:18) of kišib gid₂ as “eine (Schuld)urkunde prolongieren”.

21
kišib₃ dib-ba) are accumulated as the sag-nig₂-gur₁₁-ra-kam of SNAT 434, a balanced account. Small amounts of wheat (gig and ziz₂), are also included with the barley as “capital”. The expenditure out of these available assets includes the payment of two probable field rents, one of four gur of barley, a-ša₁/gša-ma -nu-ta “(rent) from the willow field”, and a second much larger payment, half of which was 20 gur of barley and half was 20 shekels of silver, a-ša₁ la₂-mah -ta “from the Lamah field”. The barley equivalent (še-bi) of the silver is also 20 shekels and thus the barley:silver price ratio is 300 sila₃ = 1 shekel. The difference between the assets and expenditures, la₂-ia₃-am₂₃ is the remainder in nig₂-kₐ₃-ak še ur₃-ra kišib₁ dib-ba kus-ga-ni “balanced account of loan barley and audited sealed documents of Kugani, who was probably also responsible for paying the field rents recorded in the account. ²³

Three documents in Table 3 account wholly or partly for barley expenditures for the Girsu bala. One tablet is from Lagaš’s early season (bala dub-sag) and two are subscribed bala-bi 1-am₃. ²⁴ Each of these texts contains relatively small transfers of silver, one of which replaced a small deficit (la₂-ia₃ su-ga). They were all receipts of silver in lieu of barley and the barley:silver ratio in each case was 300 sila₃ per gin₂.

**Expenditure via Merchants/Trade Agents**

Like the accounts listed in Table 3, the so called merchant accounts are characterised by the syntax (sag-nig₂-gur₁₁-ra-kam₄) ša₁-bi-ta…………………………..zi-ga, la₂-ia₃/diri but on this occasion record the expenditure of provincial resources defined as capital or available assets supplied to the merchants and debited in the account. ²⁵ There are important features which distinguish them from the accounts just discussed. First and most obviously they are subscribed nig₂-kₐ₃-ak PN (dam-gar) “accounts (concerning the activities) of PN, (merchant/trade agent)” and second they itemise in the sag-nig₂-gur₁₁-ra-kam section “goods” made available by the provincial administration, possibly from surpluses, to be expended on the acquisition via merchants of commodities not available from its own institutional producers. This understanding of the function of the “debits” section is central to an interpretation of the barley:silver ratios calculable in the merchant accounts, since for the most part the only significant transactions involving barley appear in this part of them. The “credits” in these accounts catalogue and value the withdrawals and thus “purchases” of these commodities from the merchant’s store by a variety of officials of the provincial administration (Steinkeller 2004: 99), but these almost never include barley. Note that the subscript to YOS 18, 123, nig₂-kₐ₃-ak nig₂-sa₁₀-ma/ur₃-dumu-zi-da dam-gar₄/ mu nanna kar-zi-da ba-hun, ²³ It is not entirely clear to me as to whether we should read kišib₁ dib-ba, perhaps “audited sealed document”, or kišib₄ dab-ba, perhaps “binding sealed document”, in this context. My preference is for the former. The most plausible explanation of the text SNAT 434 is that incorporated in it were the contents of associated sealed documents (kišib₃) from different years, which for the most part had been audited (kišib₁ dib-ba), although, in one of the years, the audited loan barley and barley products provided as “capital” had not been sealed (obv. (ii) 13. dib-ba kišib₃ nu-tu₃). The kišib₄ dib-ba could be subsidiary documents linked to balanced accounts as they appear to be in SNAT 434 and were stored together with the account tablets in the same pisan dub-ba. Both BPOA 1, 1139 and UTI 3, 2103 are tags from baskets of tablets which contained nig₂-kₐ₃-ak u₃ kišib₁ dib-ba-bi “balanced accounts and their audited documents”. Equally, the kišib₄ dib-ba existed independently of the balanced account as a document registering commodities. CTNMC 52 registers a variety of grain products as the contents of audited sealed documents (ša₁ kišib₃ dib-ba) and others which are registered in sealed documents but which are apparently not audited (ša₂ kišib₄-ba), those for which a sealed document was not available (kišib₁ nu-ga₃) and the contents of a tablet on which a seal had not been rolled (kišib₃ nu-ra-a). Its subscript, rev (ii) 6-8, indicates that the kišib₁ dib-ba is to become part of the contents of a first basket of tablets belonging to ARAD, (kišib₃ dib-ba-ša₁ pisan 1-kam/pisan ARAD-ta).

²⁴ See Sharlach (2004:77-82) for identification of the bala seasons in the Lagash province and the terms bala dub-sag, bala egr and bala-bi 1-am₃ and bala-bi 2-am₃.

²⁵ sag-nig₂-gur₁₁-ra-kam in these merchant accounts again appears to be amissible. Albeit some of the texts listed in Table 4 omit the term, they nevertheless exhibit variants of the syntax described here.
“the account of the things purchased (concerning) Ur-dumuzida, merchant, the year the en-
prisestess of Nanna of Karzida was installed” specifies “purchases”\textsuperscript{26}. A third significant difference between the merchant accounts and those in Table 3 is the unit of account used in these records. In the merchant accounts this is always silver rather than barley so that the equivalent value of any commodity is “ku-bi” rather than “še-bi” and the value of capital or debits in the account is calculated as a weight of silver and not a quantity of barley. Expenditures or credits in the accounts are also converted into silver as are all deficits and surpluses carried forward to the next accounting period.

Table 4 outlines the main features of only those few merchant accounts which contain barley to silver equivalents and therefore allow the calculation of the barley:silver price ratio.\textsuperscript{27} Unlike all of the texts discussed to this point and the silver loan documents examined later, these texts deal with the provision of barley as “capital” converted to equivalent values in silver for accounting purposes, perhaps rather than the physical transfer of silver in lieu of barley. Fifteen of the sixteen merchant texts studied here and summarised in Table 4 are from Umma. MVN 11, 101 is the only one that originates from elsewhere - Girsu. Between them, the sixteen texts contain 22 separate attestations from which the barley:silver ratio can be computed and these are all listed in the Appendix.

The Umma administration supplied a substantial range of so-called capital goods (sag-nig₂-gur₁-
ra-kam) to the Umma merchants to disburse in acquiring commodities on its behalf. Ranked in order of their silver value, they were grain (often barley), silver, wool, dates, fish, sheepskin and leather goods, flour, resins, smoked fish, and fish oil (Ouyang 2013: 117-8). The most substantial in quantity and value was grain (36%) followed in value by silver (22%), which was nevertheless not much greater in value than wool (20%). Grain, silver, wool and dates comprised almost 90% of the “capital goods” received by the merchants from the Umma administration.\textsuperscript{28} Other than

\textsuperscript{26} See also Sauren 001 from ŠS 3 with a similar subscript: nig₂-ka₃-ak nig₂-sa₃₈-ma/ša₃ urti₃-ma/giri₃ ab-ba-gi-na/mu si-ma-num₂{ki} ba⁻tu/hul\textsuperscript{3}. Although it doesn’t specify an account of a merchant, it is a balanced account and Aba-gina is possibly identified in an Umma text from ŠS 6 as an overseer of merchants (Ouyang 2013:116-7).

\textsuperscript{27} Excluded from table 4 are those texts in which še i₃-sah₂ (⁻ka) is supplied to merchants as capital to trade. Ouyang (2013:145) proposes that the term means that such barley was issued to Umma merchants for the procurement of lard. She argues that pig farming was relatively insignificant in the Umma institutional economy and thus the provincial administration relied on the merchants to provide the large additional quantities of lard they required. However, an obvious question is, why earmark barley as the specific capital item to acquire lard from local producers? Why couldn’t merchants trade with lard with any of the commodities supplied to them as capital - unless “barley(grain) of the lard” is different from “barley” and is perhaps required to be fed to pigs to produce lard? This notion may be supported by the Umma text from Šulgi 45, MVN 03, 210, which reads obv. /10 2(Barig) 3(Baraš) še gur lugal/še i₃-sah₂-ka⁻še₃/mu engar-e-ne-së₃/KLAN⁷-ta/ki ARAD₂-ta/rev./a-tu šu ba⁻tu³/seal impression/itti ṯummu-zi/mu ur-bi₂-i₃-lum ba⁻hu₇/seal/a-tu/dub-sar/dumu lugal-sa₃-ga. “3150 litres of barley by the royal measure, for grain of the lard for the farmers from KLAN, Atu received from Arad, in the month of Dumuzi of the year Ubilum was destroyed. Sealed by Atu the scribe, son of Lugalsaga.” Ouyang (ibid) also suggested that lard was acquired from local families each rearing pigs on a small scale. This text would suggest that the rearing of pigs was undertaken specifically by “farmers” as well as, or even rather than, the generality of local village families. The grain was supplied by Arad, who is identifiable as the ka-guru of the Umma government. All of the attestations to še i₃-sah₂ in the CDLI database are in some 26 Ur III Umma texts (one from Garšana) and six of these refer to n še gur, še i₃-sah₂-ka distinguishing “grain of the lard” as a qualifier of barley.

\textsuperscript{28} These percentages are based on Ouyang’s statistical results regarding which it is necessary to enter the usual caveat. It is of course equally true of the data and statistics presented in this paper which can only be derived from analyses of the texts available to study. As with all other texts from Sumer available to us, these are only those which have found their way into collections, the majority via the antiquities market. All of these have not yet been published and transcribed. The vast majority (87%) of the 75000+ texts of all genres which are accessible, emanate from no more than three places, Umma (37%), Girsu (32%) and Drehem (Puzriš-Dagan) (18%). Those with a provenance of Ur are the next most numerous but constitute less than 6% and of Nippur less than 5%. Garšana is the origin of less than 2% and the many provenances of the remainder provide less than 0.27% each (Moliña 2008: 52-3).
silver, therefore, the assets or capital which the governing institutions made available to the merchants for exchange were primarily the accrued surpluses of staples produced by their own organisation.

Silver as capital was supplied to the merchants exclusively by four major recipients of silver revenues, all members of the family of the ensi₂ (Ouyang 2013:96-7). Other forms of capital such as barley were supplied by a variety of administrators including the ensi₃, but perhaps the most important supplier of barley was the ka-guru “chief granary officer” of the Umma administration also a member of the governor’s family. Yet other kinds of capital were chiefly issued by the four officials, various scribes and people with occupations such as gardeners and fishery inspectors.

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila₃ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVN 11, 101</td>
<td>nig₂-ka₆-ak PN dam-gar₃, bala-bi T-am₂</td>
<td>n še gur, ku₂₁ gur₂₁</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>SNAT 276</td>
<td>nig₂-ka₆-ak PN &lt;dam-gar₃&gt;</td>
<td>ša₃-bi-ta, n še gur ku₂₁ gur₂₁</td>
<td>Umma</td>
<td>250</td>
</tr>
<tr>
<td>YNER 8,1</td>
<td>nig₂-ka₆-ak PN dam-gar₃, egi₃ ba₃-us₂-ta nig₂-ka₆-bi ba-a</td>
<td>n še gur ku₂₁ gur₂₁</td>
<td>Umma</td>
<td>233</td>
</tr>
<tr>
<td>Fs Jones 216</td>
<td>nig₂-ka₆-ak PN dam-gar₃</td>
<td>ši₂-tum, n še gur, ku₂₁ gur₂₁, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>240</td>
</tr>
<tr>
<td>HUCA 30, 113-114</td>
<td>nig₂-ka₆-ak PN dam-gar₃</td>
<td>n še gur ku₂₁ gur₂₁, ša₃-bi-ta, šu ba₂-ti, la₂-la₃</td>
<td>Umma</td>
<td>300</td>
</tr>
<tr>
<td>SANTAG 6,119</td>
<td>nig₂-ka₆-ak PN [dam-gar₃]</td>
<td>[ši₂]-tum, n še gur ku₂₁ gur₂₁, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, [zi₃-ga, la₂-la₃]</td>
<td>Umma</td>
<td>277</td>
</tr>
<tr>
<td>TCL 5, 6056</td>
<td>nig₂-ka₆-ak PN dam-gar₃</td>
<td>ši₂-tum, n še gur ku₂₁ gur₂₁, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>300</td>
</tr>
<tr>
<td>YNER 08, 07</td>
<td>nig₂-ka₆-ak PN dam-gar₃</td>
<td>ši₂-tum, n še gur ku₂₁ gur₂₁, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>360</td>
</tr>
<tr>
<td>JRAS 1939, 32</td>
<td>nig₂-ka₆-ak PN dam-gar₃</td>
<td>ši₂-tum, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, n (ban₂) še ku₂₁ b₂-šu, zi₃-ga bala₂-a, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>270</td>
</tr>
<tr>
<td>YNER 08, 11</td>
<td>nig₂-ka₆-ak PN (dam-gar₃)</td>
<td>ši₂-tum, n še gur ku₂₁ gur₂₁, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>294</td>
</tr>
<tr>
<td>MVN 01, 240</td>
<td>nig₂-ka₆-ak PN (dam-gar₃)</td>
<td>n še gur ku₂₁ gur₂₁, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>225</td>
</tr>
<tr>
<td>YOS 18, 123</td>
<td>nig₂-ka₆-ak nig₂-ša₃-bi-ma PN dam-gar₃</td>
<td>n še gur ku₂₁ gur₂₁, sag-nig₂-gur₂₁-ra-kam, ša₃-bi-ta, zi₃-ga-am₂, la₂-la₃</td>
<td>Umma</td>
<td>300</td>
</tr>
</tbody>
</table>
Table 4. Barley expenditures in merchant accounts.

<table>
<thead>
<tr>
<th>Text Sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila of barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCL 5, 5680</td>
<td>nig₂-ka₃-ak PN</td>
<td>bi-ta, ku₂-bi, zi-ga-am₁</td>
<td>Umma</td>
<td>328</td>
</tr>
<tr>
<td>SNAT 490</td>
<td>nig₂-ka₃-ak dam-gar₂ ša₂-ša₂ ū₃-ma gir₁ PN</td>
<td>n še gur ku₂-bi n gin₁, sa₃-gur₁-ra-kam, ša₃-bi-ta, ku₂-bi, zi-ga-am₂₂, diₙ</td>
<td>Umma</td>
<td>225</td>
</tr>
<tr>
<td>YNER 8, 14</td>
<td>nig₂-ka₃-ak dam-gar₂-ne PN</td>
<td>n še gur ku₂-bi n gin₁, ša₃-bi-ta, ku₂-bi, zi-ga-am₂₂, la₂₂-lₙ₁</td>
<td>Umma</td>
<td>420</td>
</tr>
<tr>
<td>YNER 08, 15</td>
<td>nig₂-ka₃-ak PN (dam-gar₂)</td>
<td>n še gur ku₂-bi n gin₁, ša₂₂-bi-ta, ku₂-bi, zi-ga-am₂₂</td>
<td>Umma</td>
<td>360</td>
</tr>
</tbody>
</table>

Compared with the limited variety of their capital goods, the products acquired for and supplied to the different departments of the provincial administration by the merchants were far more diverse. Barley, however, hardly features in these accounts other than as “capital” supplied to the merchants by the provincial administration. Of the sixteen texts listed in Table 4 only JRAS 1939, 32, an account of Šeskala the merchant, can categorically be said to attest to the supply of barley from a merchant to some function of the governing institutions. Obverse (ii) 17-20 identifies the withdrawal from the merchant of 30 litres of barley equivalent to 20 grains of silver by Hulibar, as fodder for a mule (ša₂₂-kunga₂) and received by (under the seal of) Lugina. The barley:silver ratio in this instance is 1 gur (300 sila₃) barley per shekel of silver.

A second Umma text, SNAT 276, may be argued to be a merchant account in which, though still relatively small, more substantial quantities of barley are supplied to the administration of the province. This a small balanced account of nig₂-u₂-rum which records the expenditure of silver “capital” on lard and two quantities of barley, 2 gur and 6 gur. The silver equivalents were 3 shekels and 6 shekels, respectively giving barley:silver ratios of 200 sila₃ per shekel and 300 sila₃ per shekel. Since the supply of silver to the merchants as “capital” with which to acquire various commodities was monopolised by the Umma administration, which was also the predominant destination of lard supplied by the merchants, and although the text does not say so, it is as likely as not that the account records transactions made with the administration by nig₂-u₂-rum dam-gar₂. He is possibly identified as a merchant in one text only, namely MVN 13, 864.

The sixteen texts of Table 4 represent a total of 22 entries in the Appendix. Deviation from the “standard” 300 sila₃ of barley per shekel of silver is markedly more common in the Umma merchant texts than Girsu institutional texts. The sole Girsu merchant text suggests that the Girsu administration may have supplied barley “capital” at the price of 1 gur of barley per shekel more consistently; cf. the valuation evident in the texts discussed earlier. Figure 1 illustrates the range of values of barley:silver ratios from all 22 entries. The mean value of the ratios in Figure 1 is 293 sila₃ per shekel, while the median value is 300 sila₃ per shekel as is the mode value. One standard deviation in the distribution is 57 sila₃ per shekel. The vertical bars in Figure 1 represent one std.dev. on both sides of the mean of 293 sila₃, so that for all intents and purposes and allowing for a relatively small sample, all but two three outliers exhibit barley:silver ratios in the range of 1 gur ± 1 barig per shekel.
3. Loans and receipts of silver with repayments in barley

Loans of silver with repayment in barley

By far the largest category of texts which has somewhat problematically been mined as a source from which to calculate a barley:silver price in earlier Ur III price studies, records loans of silver with promises of repayment in barley. These promises are often witnessed and made with oaths in the name of the king and the documents frequently bear the seal of the person in receipt of the loan.

Table 5 summarises the content of 25 such texts, twelve of which are from Nippur, eleven from Umma and one each from Girsu and Puzriš-Dagan. The delineating syntax of these texts is *n gin₂ ku₁-babbar//še-n gur//ki PN1-ta//PN2 šu ba-ti//either su-su-dam “to be replaced” or ag₂-e-dam “to be measured out”. The month dates of when the loan is received and of when it is to be repaid are usually but not always included. There are variations in the terminology used in the loan documents, though these do not alter much their fundamental meaning. A frequent variant is *n gin₂ ku₁-babbar//še n gur-ta “n gur of barley for each (shekel of silver)” su-su-dam or ag₂-e-dam also have variants, gi₂-gi₂-dam “to be returned”, šum₂-mu-dam “to be given” and ga-ag₂ bi₂-du₁₁ “I (will) measure out”, he promised”. Other variants appear to be largely orthographical such as ag₂-da < ag₂-(e)-da. In two texts in Table 5, both from Nippur, nig₂-sa₁₀(=am₁)-bi is written where še-bi might be expected and have a meaning which excludes that of price.  

Such use of these loan texts is principally by Snell, cf. his table 6. Grains (Snell 1982:138-143). Gomi (1984:233) has already noted, “We must be very careful when we try to calculate the price of barley in a loan contract”. He refers to Owen Nippur 17, NATN 017 here, CBS 7790 in Snell’s table, to show that Snell calculated the price of 0.45 še of silver per sil₃ of barley from the quantity of barley the borrower promised to repay at the rate of 400 sil₃ per shekel of silver, as set in the contract. Gomi argues that the price of barley in this contract is most likely to be 0.6 še per sil₃ or 1 shekel per 300 sil₃, since a rate of 400 sil₃ per gin₂ includes the typical 1/3 interest rate common to barley loans in the Ur III period. He is almost certainly correct in his assumptions and criticism, though I return to the issue in a further discussion of this text below.

See my discussion elsewhere of the Sumerian concept of price and the semantic range of translations of nig₂-sa₁₀(=am₁) (Cripps 2014:220-3).
Six of the Nippur texts in Table 5 explicitly affirm that barley is expected in repayment of the silver loan. \( n \) gin\(_2\) ku\(_1\)-babbar//še-bi \( n \) gur//ab-ši-gar in these texts translates as “\( n \) shekels of silver, (with) \( n \) litres of barley is being replaced.”\(^{31}\) None of the remainder of the 25 loan texts contains this phrase and it is clear that it was not essential to the loan contract in which for whatever reason repayment in barley was required to redeem the debt. It does occur in three of the texts in Table 6, distinguished as receipts. Though these documents do not contain any specific promise to repay the loan with barley, the barley:silver ratios in most of them suggest that the silver received could be a loan, the repayment of which may be documented elsewhere.

\(^{31}\) In NATN 017 the alternative syllabic spelling of gar in ab-ši-gaz-ar is preferred. Both spellings are the passive of the verb gar “to put/place”. The terminative infix -ši- changes the meaning to “put for” (thus “to restore/replace”); the pronounal b- is “it”. This interpretation contrasts with the translation of the term as “were assessed” by Steinkeller (2001:56). I revisit Steinkeller’s treatment of the text in a later discussion. NATN 312 has the same phrase in a subordinate bānum construction viz. \( n \) gin\(_2\) ku\(_1\)-babbar/ še-bi \( n \) gur/ab-ši-gar-ra “\( n \) shekels of silver which is being replaced (with) \( n \) litres of barley”.

\(^{32}\) Iti e-šu-nu-um in Nippur is month (6) and equals kin-šinanna. It is the Ur III month eponym of the elaunum festival cf. Sallaberger (1993:202) and CAD e page 136 s.v. elaun.
<table>
<thead>
<tr>
<th>Text sigla</th>
<th>Indicative phrases</th>
<th>Loan period</th>
<th>Provenance</th>
<th>mean sila\textsubscript{3} barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMH NF 1-2, 33</td>
<td>33 n gìn, kù-babbar, še n gur bi [ab]-ši-gar, še-bi n gur, ki-PN1-ta, PN2 šu ba-ti, ag₃-e-dam mu lugal-bi in-pa₃ (witnessed) (seal)</td>
<td>to be repaid in iti sig₄ (month 3: mid-harvest)</td>
<td>Nippur</td>
<td>540</td>
</tr>
<tr>
<td>NATN 312</td>
<td>33 n gìn, kù-babbar, še-bi n gur, ab-ši-gar-ra, ki-PN1-ta, PN2 šu ba-ti, ag₃-e-dam (witnessed) (seal)</td>
<td>išu₃-kù₄ to iti sig₄ (month 7 to month 3: early sowing to mid-harvest)</td>
<td>Nippur</td>
<td>600</td>
</tr>
<tr>
<td>TMH NF 1-2, 060</td>
<td>33 n gìn, kù-babbar, še-bi n gur, ki-PN1-ta, mu-PN2-še₃, kāšt PN3, šum₄-mu-dam, mu lugal-bi in-pa₃, (witnessed) (seal)</td>
<td>išu₃ še-sag₄₃₅₆₇₉₁₁₆ to iti gu₄-si₃-su (month 12 to month 2: irrigation to mid-harvest)</td>
<td>Nippur</td>
<td>481</td>
</tr>
<tr>
<td>NATN 121</td>
<td>33 n gìn, kù-babbar, še-bi n (gur), ab-ši-gar, ki-PN1, PN2 šu ba-ti, su-su-dam (seal)</td>
<td>iti bara₃-za-gar-ra to iti sig₄ (month 1 to month 3: late irrigation to mid-harvest)</td>
<td>Nippur</td>
<td>450</td>
</tr>
<tr>
<td>NATN 017</td>
<td>33 n gìn, kù-babbar, n še gur-ta, ab-ši-ga₂₃ ar, kislah ag₃-e-de₂₃₄₅, ki-PN1, PN2 šu ba-ti, aš₃₄₅, nam-10 PN3 uru₃-e-de₅₆ PN2, PN1 in-nam₇ sum, mu lugal-bi in-pa₃, (witnessed) (envelope seal)</td>
<td>iti-sig₄₅-ga (month 3 to threshing: mid-harvest to end harvest)</td>
<td>Nippur</td>
<td>400</td>
</tr>
<tr>
<td>MVN 13, 881 &amp; 882</td>
<td>33 n gìn, kù-babbar, še-bi n gur, buru₃₄₅ ama-bi gi₃₄₅ gi₃₄₅ su₃₄₅-su-dam, mu lugal-bi in-pa₃, ki-PN1-ta, PN2 šu ba-ti (envelope seal)</td>
<td>Loan received in iti mē-gi₃₄₅-ga (month 11: irrigation to harvest)</td>
<td>Puzriš-Dagan?</td>
<td>360</td>
</tr>
<tr>
<td>MVN 13, 246</td>
<td>33 n gìn, kù-babbar, še-bi n gur-ta, ki-PN1-ta, PN2 su-su-de₅₆ (seal)</td>
<td>šu₃₄₅-ta₃₄₅, iti pa₄₅-u₅₆ₑ₇ to iti sig₄ (month 9 to month 11: late sowing to irrigation)</td>
<td>Umma</td>
<td>240</td>
</tr>
<tr>
<td>AUCT 1, 98</td>
<td>33 n gìn, kù-babbar, še-bi n gur, ki-PN1-ta, PN2 šu ba-ti, mu lugal-bi iti... ag₃₄₅ da i₃₄₅-in-pa₃, (witnessed)</td>
<td>To be repaid in iti nesag₄ (month 4: late harvest)</td>
<td>Umma</td>
<td>452</td>
</tr>
<tr>
<td>AUCT 1, 965</td>
<td>33 n gìn, kù-babbar, še-bi n gur, ki-PN1-ta, PN2 šu ba-ti, mu lugal ezem nesag₄-e ga-ag₃₄₅ i₄-in-pa₃, (witnessed)</td>
<td>iti pa₄₅-u₅₆ₑ₇ to ezem nesag₄-e (month 11 to month 4: irrigation to late harvest)</td>
<td>Umma</td>
<td>444</td>
</tr>
<tr>
<td>PPAC 5, 956</td>
<td>33 n (gìn) kù-babbar, še-bi n (gur), ki-PN1-ta, PN2 šu ba-ti, su-su-dam, mu lugal-bi in-pa₃, (witnessed) (seal)</td>
<td>To be repaid in iti nesag₄ (month 4: late harvest)</td>
<td>Umma</td>
<td>600</td>
</tr>
<tr>
<td>NUL 06</td>
<td>33 n (gìn) kù-babbar, še-bi n (gur), ki-PN1-ta, PN2 šu ba-ti, su-su-dam (seal)</td>
<td>iti nesag to iti ri (month 4 to month 5: late to end harvest)</td>
<td>Umma</td>
<td>420</td>
</tr>
<tr>
<td>SANTAG 7, 172</td>
<td>33 n gìn, kù-babbar, še-bi n gur, ki-PN1-ta, PN2</td>
<td>After the harvest.</td>
<td>Umma</td>
<td>600</td>
</tr>
</tbody>
</table>

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33 iti ezem-mah is month 9 in Puzriš-Dagan and probably Nippur (Wu 2002:117) while iti gu₄-si₃-su₄ is month 2 in Nippur.
Redemption of these silver loans is invariably to be made during or after the harvest. Two texts are explicit about repayment at the barley harvest. NYPL 387 assesses the barley required to repay the silver loan as še buru₄₄ a-na-ag₂₄ bi n še gur-ta “its measured to him at the harvest barley, n litres for each (shelok of the loan)”. The loan of four and a half shekels is to be repaid at the rate of 1 gur and 1 barig of barley per shekel of silver or 360 sila₃ per shekel. The loan is made in month 8 (October-November), which is a late sowing/end of ploughing period, and is scheduled to be replaced (su-su-dam) in month 1 (March-April) which is apparently at the beginning of the harvest in Girsu. In the Umma text SANTAG 7, 172, on the other hand, the loan period is not dated. It is merely specified that the loan of 15 shekels of silver su-su-dam “is to be replaced” with 30 gur of barley (i.e. 600 sila₃ per shekel) egir buru₄₄ “after the harvest”. In several instances redemption of the loan is to occur when the harvested barley is measured out on the threshing floor (kislah/ki-su) NATN 017, YOS 4, 27 and YOS 4, 48. In none of these is the redemption date otherwise specified. However, threshing probably occurred during months 4 to 5, June-July to July-August (Potts 1997:73).

Further explicit attestations that the repayment of debts mainly took place at harvest time is indicated in several texts by the phrase buru₄₄ ama-bi gi₃-gi₄ “the harvest will remit this debt”. The phrase primarily appears in those few Ur III texts which suggest that the cancellation of debts may also have occurred around harvest. Borrowers could on occasion be released from their debts

Table 5. Loans of silver with repayment in barley

<table>
<thead>
<tr>
<th>Text sigla</th>
<th>Indicative phrases</th>
<th>Loan period</th>
<th>Provenance</th>
<th>mean sila₃ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>YOS 4, 049</td>
<td>n gin₄₄ ku₄₄-babbar, še n gur-ta, ki-PN1-ta, PN2 šu ba-an-ti, su-su-de₃₁ mu lugal-bi in-pa₃₊ (seal), (witnessed)</td>
<td>iti ᵃ⁻ᵖᵃᵤ⁻ᵘₑ to iti še-kar-gal₂₉ (month 11 to month 3: irrigation to mid-harvest)</td>
<td>Umma</td>
<td>450</td>
</tr>
<tr>
<td>SAT 3, 1987</td>
<td>n gin₄₄ ku₄₄-babbar, še-bi n gur-ta, ki-PN1-ta, PN2 šu ba-ti, su-su-dam (seal)</td>
<td>iti⁻ᵈ⁻думу⁻ζᵣ⁻ₑ to ki-su₇ (from month 12 to threshing: irrigation to end harvest)</td>
<td>Umma</td>
<td>360</td>
</tr>
<tr>
<td>YOS 4, 48</td>
<td>n gin₄₄ ku₄₄-babbar, še-bi n gur, ki-PN1-ta, PN2 šu ba-ti, ki-su₄ ag₂-e-da, mu lugal-bi in-pa₃ (witnessed) (seal)</td>
<td>iti⁻ᵈ⁻думу⁻ζᵣ to ki-su₇ (from month 12 to threshing: irrigation to end harvest)</td>
<td>Umma</td>
<td>420</td>
</tr>
<tr>
<td>YOS 4, 27</td>
<td>n gin₄₄ ku₄₄-babbar, še-bi n gur, ki-PN1-ta, PN2 šu ba-ti, mu PN₄šₑ₅, še-bi ki-su₄₉-ka ag₂-e-da, mu lugal-bi in-pa₃ (seal)</td>
<td>iti še-sag₂₄-ku₄ to ki-su₇ (month 1 to threshing: last irrigation to end harvest)</td>
<td>Umma</td>
<td>450</td>
</tr>
<tr>
<td>YOS 4, 20</td>
<td>n ku₄₄-babbar₂₄, še-bi n gur, ki-PN1-ta, PN 1, PN2, PN3, [su-ba]-li-eš, mu lugal-bi in-pa₃ₑ₅ (seal)</td>
<td>iti⁻ᵈ⁻думу⁻ζᵣ to [iti⁻šᵉ-kar⁻ra-gaľ⁻l₃⁻l₆] (month 12 to month 3: irrigation to mid-harvest)</td>
<td>Umma</td>
<td>450</td>
</tr>
</tbody>
</table>

34 I have followed Potts (1997:74) and his Table III.1 “Stages in the Mesopotamian agricultural calendar” to correlate Mesopotamian months with our modern calendar and to assign the agricultural operations (ploughing, sowing, irrigation, harvest etc.) appropriate to specific months of the year. Potts’s correlations are with the Girsu calendar. I have assumed that differences in the times of these operations in neighbouring Umma or even Nippur are marginal or perhaps non-existent.

35 Literally “harvest returning (to) its mother”. ePSD translates ama-ar-gi₄ as “reversion to a former state”. Cf. also CAD A2 p.115 s.v. andōturum for ama-(ar)-gi in the lexical notes and with an OB meaning of remission of (commercial) debts. The literal translation suggests that its etymology is from the alternative interpretation of ama-ar-gi₄, “manumission”.

29
on the grounds that their harvest had failed due to a natural disaster such as an inundation from the river in spate or a storm, either of which had laid waste their crop of barley. At least, this appears to have been the case in Nippur and Puzriš-Dagan. I am not aware of evidence for the remission of this kind of debt from other provinces in the Ur III state. \textit{MVN 13, 881 & 882} in Table 5, perhaps from Puzriš-Dagan, is the only text directly relevant to this price analysis, that is, in which a loan of silver is to be repaid by barley and which may be subject to this provision. It reads obv. /2 ginš ku₃-babbar /še-bi 2 2(barig) gut /buru₁₄ ama-bi gi₄-gi₄ šu₃-su₃-da /ba-a-mu/rev./mu lugal-bi in-pa₃/ki 4 nanna-i-gi-ta /ba-a-mu /šu ba-ti /iti me-gi₂-gal₂/[mu en] 4 nanna ma₃-e i₃-pa₃. “2 shekels of silver, its barley 720 litres. The debt will be cancelled at harvest time, should (the harvest) be inundated. Ba’amu has made an oath in the name of king. Ba’amu received (the loan) from Nanna-igi in the month Mekigal of the year when the en priestess of Nanna was chosen by omens.” The crucial indicator that the text describes a loan which is to be repaid is given by the phrase buru₁₄ ama-bi gi₄-gi₄. In each of the texts containing this phrase and discussed here, it is evident that the borrower’s obligation for the debt incurred will be discharged by repayment from the borrower’s barley harvest. The loan in this instance was again to be repaid at the rate of 360 síla₃ per shekel although the text is obscure with regard to whether it will be repaid or not. There is no repayment term to which Ba’amu’s oath refers. Nor does the oath verify his receipt of the silver. The fact that Ba’amu has made an oath actually precedes the recording of the receipt of the silver. It immediately follows, however, the statement of the remittable amount of the debt.\footnote{It is probable that release from a debt was conditional on there being actual destruction of the borrower’s barley harvest. It seems also to have depended on the whether or not the distressed debtor petitioned the king and/or the administration of a temple, that he had suffered losses through natural disaster (Steinkeller 2002:134 note 18). The oath made by Ba’amu may be an indication that he was not going to petition the king or the temple for debt relief. There are three examples from Nippur of renunciations of such a petition by borrowers; none of which is a loan of silver. \textit{NRVN 1, 180} records a loan made with barley from the temple household of Enlil and reads thus: obv. /1(barig) 4(ban) še še-kal -la₁/1(barig) 4(ban) a₂-zí-da/1(barig) 4(barig) ur₄-nin-urta /še ur₃-ra /en-ša-lis₂ /ki lugal-nam-tar-rec-ta /šu ba-ti-eš₂ /kišib₂ ur₄-nin-urta /rev./buru₁₄ ama-bi gi₂-gi₂/a-ša₃-mu a-e ba-ab-rec /u₂-de₃ ba-ab-rec /mu-ub-be₂-ne₂ /lugal-rec u₁₃ sang₄ na-na-bey₂-a /mu lugal-bi i₃-pa₃-dec₂-ša₂ /iti diri še-sag₁₁-kus /mu en-am-gal-an-na en 4 i₃-nan₄a ma₃-e i₃-pa₃ /seal/ur₄-nin-urta /dumu lu₂₃-amma. “100 litres of barley to Šekala, 100 litres to Azida, 100 litres to Ur-Ninurta, barley loan (of the temple household) of Enlil, they received from Lugal-nam-tare, under the seal of Ur-Ninurta. The harvest will remit this debt. They have sworn in the name of the king, in the intercalary month “Barley Harvest” in the year when Enamgalanna was made en priest of Inanna by extispicy, that they have not said nor will they say to the king and the chief household administrator “my field was ruined by flooding (or) was ruined by the storm”. }

\textit{TMH NF 1-2, 069} is the second Nippur text which is also an example of the borrower, perhaps for the reason that the anticipated damage from storm and flood did not materialise, foregoing a petition for relief. The text reads; obv. / [...] še gut /še /en-lil-la₂ /ki ba-si-ge-de₂ /ki lugal-nam-tar-rec-ta /ur₃₄-ia-ia₃ /šu ba-ti /iti diri še sag₁₁-kus /mu en-mah-gal-an-na en 4 i₃-nan₄a ba-hun /rev./še-bi buru₁₄ ama-bi gi₂-gi₂ /e₂ /en-lil-la₂-ka /i₃₄-ni-ku₃ /ku₃-a-a-ša₃-mu u₃-de₃ ba-ab-[dec] /a-e ba-ab-de₃ /lugal-rec u₁₃ sang₄ na-na-bey₂-[a] /mu lugal-bi in-pa₃ /seal/ ur₃₄-ia-ia₃ /dub-sar /dumu engar-d₂₄₃/-sag. “1[6] litres of barley, barley of (the temple household) of Enlil to be stored in that place, Ur-Haya received from Lugal-nam-tare, in the intercalary month of “Barley Harvest” in the year when Enmahgalanna was installed as en priestess of Inanna. The harvest will remit this barley debt. He (Ur-Haya) has sworn in the name of the king that entering the temple household of Enlil he will not say to the king or to the chief household administrator, “my field was ruined by the storm or by flooding”.

The remaining Nippur witness of the phrase buru₁₄ ama-bi gi₂-gi₂ \textit{NRVN 1, 179}, also provides evidence of the forswearing of debt relief. This reads; obv. /3 še gut /še ur₃-ra /en-lil-la₂ /ki aram-sù-ha₂-ta /lugal-pa₁₃-ku₃ /gù₃-la₃-ša₂-ša /šu ba-ti /rev./buru₁₄ ama-bi gi₂-gi₂ /iti sig₂-ka₁ /i₁₄-b₂-g₂ /ži₂-g₂ /a-a₃-mu a-e₃ /ba-rec /a-a₃-mu u₂-de₃ ba-rec /ba-ra-ab-be₂-en₂ /iti ud₃₄₃-ab₄₃ /mu hu-hu-nu ri-ba-hul. “900 litres of barley, barley loan of (the temple household) of Enlil, Lugal-pae, the throne bearer, received from Amar-sù-ha. The harvest will discharge the obligation. It (the debt) will be remitted in the month of the brick (month 3 May–June, a harvest month). “I will not say ’My field was ruined by flooding, or, my field was ruined by the storm”. “Month “ud₃₄₃” (month 11, January-February). Year the Huhunuri were destroyed.

Confirmation that the phrase buru₁₄ ama-bi gi₂-gi₂ indicates that \textit{MVN 13, 881 & 882} is a loan document is given by a Girsu contract, \textit{PPAC 5, 1713}, dated § 31, which reads; obv./1₄ še gut lugal / ma₃-bi 2½ /ginš ku₃-babbar /ba-
Debts redeemable with barley at harvest time may well have been incurred by cultivators to finance agricultural operations. This is arguably so for at least some of the loans which were made at times of sowing or irrigation. The maximum loan period in Table 5 is from ploughing to mid-harvest, about nine months and the shortest period is only 1 month during harvest, cf. NUL 06 from Umma in which Alla has borrowed $\frac{1}{3}$ shekel of silver for 1 month during the harvest period. The debt was to be repaid in barley in month 5 (iti ri) at the end of the harvest, thus the loan was for 1 month during the harvest. Short duration loans, especially harvest loans, were usually made to provide for the immediate subsistence of the borrower’s household and almost always in barley. However, although rarer, these kinds of loans could also be made in silver and both were usually interest bearing (Garfinkle 2004:5ff.). Alternatively, it is possible that Alla needed to borrow silver to hire labour to complete his harvest. One third of a shekel would hire one guruš for 20-30 workdays (Englund 2012b:129). Alla is required to repay the loan at the rate of 420 siša3 of barley to 1 shekel of silver, which may be evidence of a customary rate of interest.

Some repayments of silver with barley at harvest probably embodied a penalty incurred by defaulting on repayment in silver. NATN 266 in Table 5, which Garfinkle defined as a “productive” loan perhaps to be regarded as a fictitious arrangement, can be interpreted in this manner. The penalty was frequently a duplum, a repayment double the value of the loan (Garfinkle 2004:4). In NATN 266, a silversmith was loaned 25 shekels of silver in month 6, the silver principal to be returned to Nippur in month 8, possibly, Garfinkle suggests, as a worked object. If he failed to return it when agreed, the silversmith was to measure out two gur of barley for each shekel of silver after the harvest, double the amount of barley normally considered equivalent to one shekel. In this event, the barley:silver ratio was 600 siša3 barley to one shekel of silver rather than 300 to 1. The repayment of a duplum on default of a loan is explicit in NRVN 1, 049. As is apparent from the table 5 texts, and of significance to this discussion, it was quite usual in the Ur III period that a contractual penalty for default was to pay barley to redeem a loan made in silver. The penalty payments increased the rate of interest considerably and at its harshest doubled the value of the loan, though even harsher penalties such as imprisonment (cf. NRVN 1, 049) were available for non-payment (Lafont and Westbrook 2013:214).

NATN 266 is unequivocal about the penalising nature of doubling the repayment of the principal if made in barley. The repayment after the harvest is explicitly contingent on a default no doubt because the loan period would be extended by some five or six months. It is not obvious, however, that other texts in Table 5, which indicate that repayment in a harvest month is to be made with barley at a rate of two gur to one shekel of silver, double the amount borrowed, infer a contingent penalty payment. There are four other texts with repayment at this barley:silver rate; two from

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37 NRVN 1, 049 from Nippur reads: obv./ur-su-suku-ke4/ša3-ku-y3-ge-er/ku3-gu10 šum2-ma-ab/in-na-du11/ša3-ku-y3-ge-er/ur-su-suku-ra/iti bar2-za3-gar 1-c2-es ub-hul/ku3-zu maš2-bi-a-bi-da/2/3 ma-na ga-ra-la2/in-na-du11/tukum-bi nu-ra-la2/rev./1 1/3 ma-na ku3-babbar/ga-la2 bi2-du11/mu lugal-bi in-pas/ur-sukkal-ba-su -gal2 4-nin-szubur-ka/ur-zi u3 dumu a2-x-ni-a/lu2-dingir-ra dumu amar-ša3-nampa/gu1-ug2-gu lu2 ku3 4-nin-hur-sag-ka/lu2-inim-ma-bi-me/iti šig3 r3-ga $\mu$ 16-kam /l.e./ [mu $\mu$-ša3-suen] lugal-e na-ma-h in-du3. “Ur-Nusku said to Šakuge, “Give me your silver”. Šakuge said to Ur-Nusku, “In the month of Placing the Throne in the Sanctuary, unless prison has made it impossible (destroyed it), let me weigh to you your silver and its interest (together worth) 40 shekels. If I have not weighed it to you (by then), let me weigh 80 shekels of silver”, he promised. He swore in the name of the king, 4 witnesses. Year Su-Suen, the king, erected a magnificent stele”. It would seem that Ur-Nusku’s offer of a duplum in the event of further default on the loan is to avoid imprisonment, making, as he does, the plea that imprisonment will defeat his ability to repay the loan.
Nippur, NATN 437 and NATN 312 and two from Umma, PPAC 5, 956 and SANTAG 7, 172. All of these are formulaic and structured as straightforward short-term loans of silver to be repaid in barley. The first three comprise loans of relatively small amounts of silver – \( \frac{1}{4} \) shekel, 1 shekel, \( 1^{1/6} \) shekels – to be replaced or measured out, after a few months, in barley at harvest time.

SANTAG 7, 172 is an exception recording the loan of a substantial weight of silver (15 shekels), to be repaid with 30 gur of barley after the harvest (egir buru₃). It would be usual for this text to follow an oral contract and even an earlier document which contained a requirement that the debtor double the amount he repaid in barley should he default. The text, however, does not record an oath to repay, is not witnessed, but is sealed by the debtor, who is a nu-bandā₃ “captain”, subordinate of the military governor (egir šagina).

If NATN 266 is left out of consideration as a “fictitious arrangement in which goods were ‘loaned’ to a craftsman for production” (Garfinkle 2004:4), the Table 5 texts may be considered to be “harvest loans” - those for a short duration which were required to be repaid, with interest, out of the next harvest (Garfinkle 2004:6). Repayment was usually made with barley but could also be made with silver.

The notion that these loans were to be repaid with interest, immediately raises an issue as to what value should be assumed as the barley equivalent of a shekel of silver. What is the barleysilver price ratio and what rate of interest can we assume? It is evident from Table 5, that with the exception of the ratio in MVN 13, 246, the amount of barley to be repaid at harvest for each shekel of silver borrowed varies between 360 sila₃ and 600 sila₃. Most discussions of interest rates in the Ur III period conclude that the usual interest rates were 33% for barley loans and 20% for silver loans. Whether these texts should be regarded as barley loans or as silver loans is moot. Although it describes a silver loan Steinkeieller (2001:56), for example, judges that NATN 017 is effectively a barley loan with a 33% interest rate.³⁸ Clearly, if the widely accepted barley equivalent of 300 sila₃ per shekel is assumed, those loans of silver to be repaid at a rate of 360 sila₃ per shekel bear a 20% interest rate as for silver loans and those to be repaid at 400 sila₃ per shekel bear a 33% rate as for barley loans.

Out of 25 texts in Table 5 only six fall into this category; 19 replace the silver on loan with barley at rates varying from 420 sila₃ per shekel to 600 sila₃ per shekel. The mean barley:silver ratio in this range is 491 sila₃ per shekel, the median is 451:1 and the most frequently occurring (mode) ratio is 600:1. If we were to make the usual assumption that in the Ur III period, the barley equivalent of a shekel of silver was 300 sila₃ and the further assumption that all of these loans were interest bearing, the average interest rate in these 19 texts would be approximately 63%. Alternatively, an assumption that silver loans carried an interest rate of 20% would mean that the barley:silver ratio

³⁸ Steinkeieller interprets obv. 1-3 /₂²/₂ gini₃ ku₃-babbar /1 1 (barig) 4 ban₃ še gut-ta /ab-ši-ga₂-ar as “₂²/₂ shekels of silver (is the loan). For each (300 litres) of barley 400 litres were assessed (i.e. the interest is 33%)”, as opposed to “₂²/₂ shekels of silver (is the loan). Each shekel is being replaced by 400 litres of barley”, which more accurately reflects the fact that repayment of the silver loan is expected in barley to be measured out on the threshing floor. Given an assumption that 1 shekel of silver is the equivalent of 300 sila₃ (1 gur) of barley, no difference is made to the calculation that the interest rate is 33% as for a barley loan. The quantity of barley required to redeem the loan of principal plus interest is about 3³/₅ gur (1000 sila₃). In lieu of repayment in barley, the borrower gives the lender a field for him to cultivate. Steinkeieller suggests that this is the šuku field of a member of a unit of eren₃ and probably equal in area to 4 iku. He further proposes that this field compensates for the interest only, which would be equal to about 250 litres of barley. However, a 4 iku field in Nippur could perhaps be expected to produce nearly 4¹/₂ gur (1350 sila₃) at 20 gur per buru (Widell 2013:64). ₂²/₂ shekels at 300 sila₃ of barley per shekel is equivalent to 750 sila₃; 1350 minus 750 is 600 sila₃ of barley, so that even after costs of production are deducted, a 4 iku field could be expected to produce ample barley to redeem the loan of ₂²/₂ shekels of silver plus interest of 250 sila₃, otherwise the debt would not be redeemed.
varied between 340 and 540 sila₃ per shekel. A 33% interest rate would mean a variation in the ratio between 300 and 500 sila₃ per shekel. We could only imagine these to be variations in price or equivalents with the greatest difficulty. The variations in the rates at which barley is to replace silver in these loans is probably as much related to the motivations for the lenders to provide credit and the borrowers to need it as to variations in the price of barley or silver. These are discussed at length by Steinkeller (2002) and Garfinkle (2004) and vary from the willingness to provide short term interest free harvest loans to an extended family to schemes by lenders to acquire labour or land to support their own agricultural operations. The notion that varying penalty rates of interest on default have been imposed, though not explicit, is probably also an explanation. They also vary according to whether they are institutional or non-institutional loans. These variations compound the difficulties of using loan documents to provide evidence of the price of either barley or silver.

Receipts of silver with barley equivalent
Despite Garfinkle’s stricture that we need to distinguish loan documents from some receipts which use similar terminology, it remains plausible that several of the receipts identified in Table 6 were precursors of or otherwise interconnected with a loan agreement. Garfinkle argued that the loan document contained a specific expectation that the loan would be repaid and can be defined as any agreement which required the repayment of the capital to the creditor (Garfinkle 2004:3). However, as anticipated earlier in discussing Table 5 entries, several of the receipts in Table 6, and in particular those from Nippur, could arguably precede a harvest loan. Four out of five of the Nippur receipts in the table are made in iti še-sag₄-ku₃ which is month twelve in Nippur, when according to Potts, the fields of young barley were irrigated before the harvest between two and four months later. Three of the Nippur records, NATN 554, TMH NF 1-2, 99, and NATN 602, indicate that the silver received “is being replaced” (ab-ši-gar(-ra)) with a quantity of barley; and share this formulation with three of the Nippur loans, suggesting that the replacement is a continuing process perhaps to be completed later. It is possible that such an expectation became formalised in an ensuing loan agreement.

The phrase ab-ši-gar also suggests the quintessential meaning of nig₂-sa₁₀-am₃ is something other than price. NATN 554 obv. 1½ gin₂ ku₃-babbar nig₂-sa₁₀-am₃//2 še gur ab-ši-gar translates to “1½ shekels of silver is being exchanged with 2 gur of barley”, literally “1½ shekels of silver, the thing exchanged, 2 gur barley is replacing it”. The barley:silver ratio in this receipt is 400 sila₃ per shekel and is therefore unlikely to represent the price of barley. The phrase nig₂-sa₁₀-am₃ in this text functions as še-bi in the comparable formula in TMH NF 1-2, 99, in which the barley:silver ratio is 450:1. NRVN 1, 194 a much broken text from Nippur, dated ŠŠ 3, apparently employs nig₂-sa₁₀-bi where we might expect še-bi and similarly may translate as “its equivalent” rather than “price” since the barley:silver ratio in this instance is 600 sila₃ per shekel. A meaning of “price” would suggest that barley was around half price with respect to silver, which could either imply a glut of barley or doubling in the price of silver. The penalties related to defaulted loans discussed earlier may be more relevant.

The texts with a Girsu provenance in Table 6 however, are clearly receipts with no apparent connection to loans. MVN 09, 011 is an account debited with silver acquired from a number of people but principally from two officials, ur₃-nāšu dumu ur₃-ba-ba₃ and nam-ha-ni, which under the seals of the same two officials is to be transferred (ugu₃-a ga₃₂-ga₃₂-dam) to an account which is the responsibility (giri₃) of ur-ab-ba dumu ba-zi₃, as ku₃ a₂ z₁₀₃-KA nu-ar₃-ra “silver of the labour of un-milled KA-flour”. The silver expended in the account presumably represents the cost of barley (še-bi) to remunerate the labour in the form of barley rations. The barley:silver ratio is 270 sila₃ per shekel. This small account is almost certainly related to the institutional accounts of labour (geme₃ and gurus) days required to mill flour and groats, cf. TIM 06, 04 and Atiqot 4, pl. 02 07 both of which are nig₂-kₐ₀-ak a₂ z₁₀₃ ar₃-ra “balanced accounts of the labour (to produce) milled flour”.

33
Labour both to mill flour and to load it into boats for transport is accounted for in these two documents.

*JMEOS 12, 41 3488*, on the other hand, receipts 1/6 mina of silver, by “a farmer of (the temple of) Ningirsu” and two others, in exchange for 50 gur of barley at the rate of 300 sila; per shekel.

Table 6. Silver receipts with barley equivalent

<table>
<thead>
<tr>
<th>Text sigla</th>
<th>Indicative phrases</th>
<th>Month date</th>
<th>Provenance</th>
<th>mean sila₃, barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVN 09. 011</td>
<td>šu-nig, n gin, ku-babbar ša-bi-ta, n gin, n gur-ta, kIšib, PN, ku, a ku-zi KA nu-ar-ra, ugu-a ga-ga-dam, giri, PN,</td>
<td>iti še sag₁₁-ku₃ (month 11)</td>
<td>Giršu</td>
<td>270</td>
</tr>
<tr>
<td>JMEOS 12, 41 3488</td>
<td>n gin, ku-babbar, še-bi n gur, n ig, sa₁₁-bi-še, PN1, PN2, PN3, [šu] ba-li</td>
<td>iti še-i₂₃-la (month 12)</td>
<td>Giršu</td>
<td>300</td>
</tr>
<tr>
<td>NRVN 1, 198</td>
<td>n gin, ku-babbar n (gur) še-še₂, ki PN1, PN2</td>
<td>iti še sag₁₁-ku₃ (month 12)</td>
<td>Nippur</td>
<td>450</td>
</tr>
<tr>
<td>NATN 554</td>
<td>n gin, ku-babbar n ig, sa₁₁-bi, n še gur, ab-ši-gar, kIPN1, PN2 šu ba-li, [seal]</td>
<td>[it] šu-numun (month 4)</td>
<td>Nippur</td>
<td>600</td>
</tr>
<tr>
<td>NRVN 1, 194</td>
<td>n gin, ku-babbar, še-bi n še gur, ab-ši-gar-ra, kIPN1, PN2 šu ba-li, [seal]</td>
<td>iti še sag₁₁-ku₃ (month 12)</td>
<td>Nippur</td>
<td>450</td>
</tr>
<tr>
<td>TMH NF 1-2, 99</td>
<td>n gin, ku-babbar, še-bi n še gur, ab-ši-gar-ra, kIPN1, PN2 šu ba-li, [seal]</td>
<td>iti še sag₁₁-ku₃ (month 12)</td>
<td>Nippur</td>
<td>400</td>
</tr>
<tr>
<td>NATN 602</td>
<td>n gin, ku-babbar, še-bi n gur, ab-ši-gar, kIPN1, PN2 šu ba-li, (witnessed)</td>
<td>iti še sag₁₁-ku₃ (month 12)</td>
<td>Nippur</td>
<td>400</td>
</tr>
<tr>
<td>MVN 3, 186</td>
<td>n gin, ku-babbar, še-bi n gur, PN1, PN2, šu ba-li, (seal)</td>
<td>iti ezem šul-gi (month 10)</td>
<td>Umma</td>
<td>240</td>
</tr>
<tr>
<td>Aleppo 457</td>
<td>n gin, ku-babbar, še-bi n gur, PN1, PN2, šu ba-li, (seal)</td>
<td>iti ezem šul-gi (month 10)</td>
<td>Umma</td>
<td>300</td>
</tr>
<tr>
<td>Nebraska 44</td>
<td>n gin, ku-babbar, še-bi n gur, ku-ši year date ugu, PN ba-a-gar, kIšib, PN, giri, ku ili ens₂</td>
<td>iti diri (intercalary month 5.13.00)</td>
<td>Umma</td>
<td>298</td>
</tr>
<tr>
<td>BPOA 6, 560</td>
<td>n gin, ku-babbar, še-bi n gur, ku-ši year date PN2-sha,</td>
<td>iti diri (intercalary month 5.13.00)</td>
<td>Umma</td>
<td>288</td>
</tr>
<tr>
<td>AUCT 3, 334</td>
<td>n gin, ku-babbar, še-bi n gur, ku-ši year date PN2, PN2 ša₂₁₂₁, dub ba-ta ba-a-gar, (seal)</td>
<td>iti ša₂₁₂₁ PU₂ (month 11)</td>
<td>Umma</td>
<td>504</td>
</tr>
<tr>
<td>SAT 2, 669</td>
<td>n gin, ku-babbar, še-bi n gur, la-ša, ugu, PN1, PN2 ša₂₁₂₁, dub ba-ta ba-a-gar, (seal)</td>
<td>iti ša₂₁₂₁ PU₂ (month 11)</td>
<td>Umma</td>
<td>300</td>
</tr>
</tbody>
</table>

Similarly, it seems certain that at least five of the six Umma texts document receipts of silver are not associated with loans or loan documents. Three of them certainly, or four probably, document the receipt and administration by senior officials of silver revenues of the Umma provincial government. *Nebraska 44* is a final accounting of payments of silver to Dadaga which can be matched with the same payments in an earlier receipt document (Ouyang 2013:48-50). Dadaga is one of several such officials who include Akala, Lu-kala, Gududu, Ur-e’e and others among whom is the ens₂ of Umma. These officials may exclusively be the managers of both the silver revenues and expenditures of the Umma province. Revenues encompass the payment of taxes to the
province, payments of silver from grain cultivation, from animal husbandry, from the production of cash crops and from the hiring out of labour and other factor rents. The Umma texts of Table 6 are receipts of some of these revenues.

In *Nebraska 44* Dadaga is the ultimate recipient of seven payments of silver (ugu₂ da-da-ga ba-a-gar “debited to the account of Dadaga”) which is silver either for the year “when Kimaš was destroyed (Š 46) or the following (us₂-sa) year. Three of these payments are associated with animal products - sheepskins, sheep’s innards (sa udu) and sheep’s carcasses (ad₁ udu) - and the equivalent value of the silver in terms of the quantities of these products is given. Each payment is made via a shepherd. A fourth payment of silver is made in respect of a crop of sesame seeds and its equivalent value in this commodity is also given. Three of the payments of silver received by Dadaga of most concern to us here are averaged in Table 6. Ur-e’e, Lu-kala and Ku-li the governor also officiated in *Nebraska 44*. A further payment of 18 2/3 shekels of silver with a barley equivalent of 5300 sila₂ (284 sila₁ per shekel) is recorded in the account and is acquired via (giri₃) ku-li ensi₂ as ku₁-bi mu si-[mu-ru-um³] lu-lu-bu³ a-a [...] ga [...]", perhaps “its silver for the year when Simurum and Lulubum [were destroyed/smashed...] Š 45. Another official of the administration, Ur-Šara son of Basag also receives a payment of silver of 1 1/3 shekels of silver from purchases made by yet another official, Ikala. This silver is equivalent in value to 400 sila₁ of barley, a barley:silver ratio of 300 sila₁ per shekel. The five payments in silver with a barley equivalent, entered in the Appendix and averaged in Table 6 have a mean of approximately 1 gur of barley per shekel.

A(ya)kala, the scribe and son of Ur-nigar who became ensi₂ of Umma, as did his brother Dadaga (Dahl 2007), was one of the major recipients of the Umma administration’s silver revenue. The receipt *Aleppo 457* records that he received 60 shekels of silver with a barley equivalent of 60 gur via Dadaga in Š 45. The barley:silver ratio is again 300 sila₁ per shekel. A different a-kal-a, also a scribe but son of Lugal-nesage, a tax collector (en-ku₃), received 22 3/4 shekels of silver equivalent to 5460 sila₂ of barley in Š40 at a rate of 240 sila₂ per shekel cf. *MVN 3, 186*. This Akala may well have been acting for his tax collector father in an official administrative capacity and the silver received would have been tax revenue.

It is less feasible to identify the silver received by Lu-kala in *AUCT 3, 334* as revenue of the Umma province since Lu-kala in this instance is the son of Ulu-di rather than the well attested son of Ur-e’e and member of the governor’s family, who was also one of the major recipients of Umma’s silver revenues. Further, the barley:silver ratio is 504 sila₂ per shekel suggesting that as in the case of some of the Nippur receipts this may be the precursor of a loan document imposing a penal replacement rate on default of repayment. The silver received by Ur-Šara a scribe and chief accountant (ugu₂ ur⁻⁴šara₂ ša₁-dub-ba-ka ba-a-gar) in *SAT 2, 669* on the other hand, is clearly a payment to the provincial administration in respect of animal husbandry. Ur-Šara is debited with one shekel of silver with a barley equivalent of 300 sila₁ in repayment of arrears by Dagi an animal fattener (la₂-ia su-ga da-qi kurušda). The barley:silver ratio in *BPOA 6, 560* is 288 sila₁ per shekel and the Umma document appears to be a somewhat laconic version of a simple receipt. In respect of what is unclear, however.

4. Miscellaneous silver or barley disbursements with barley or silver equivalent

Table 7 excerpts a miscellany of 20 texts, six with a Girsu provenance, four originate in Nippur and ten have a provenance of Umma. Some of the texts record a disbursement of barley with an equivalent value in silver while others disburse an amount of silver with an equivalent value in

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39 For the role of Ur-Šara, the chief accountant, in the administration of silver payments to the Umma institutions cf. Ouyang (2013: 90 inter alia).
barley. They also display a variety of contexts in which these disbursements occur, which largely defeats their classification alongside texts in our earlier tables.

The small and laconic Girsu text, MVN 6, 151, is most probably a commitment to repay the interest on a barley loan, which, however, is to be repaid in silver. Nearly 75 gur of barley is to be replaced (su-su-dam) at a rate of 2½ shekels of silver per gur (i.e. 120 sila 3 barley per shekel) with 187½ shekels. If we suppose the barley equivalent of one shekel of silver to be the standard 300 sila, a payment equal to 120 sila per shekel could represent an interest rate of 40% which compares with the usual interest rate on “customary” barley loans of 33% (Garfinkle 2004:10).

Since it was usual to repay customary loans in the same currency as the loan, repayment in silver may account for the higher interest rate. This notion may be supported by the equally small and laconic Nippur text, NATN 381, which in this instance is a receipt of barley in Nippur month 11 of Šulgi 40. Like other Nippur receipts discussed in Table 6, it is feasible that it represents a precursor to a barley loan document. Four gur of barley is perhaps to be loaned, but its gur-measure has to be checked (4 še gur//gur-bi kaši di-dam) (Civil 1994:156), following which Aba-Enlilgin received a lesser amount from Ur-Nuska; only three gur and two bang (1020 sila 3 compared with 1200 sila 3) and its silver equivalent was ten shekels. Its barley:silver ratio was therefore 102 sila 3 per shekel, which possibly looks like an interest rate of 34% on a barley loan.

Each of the remaining five texts from Girsu, regardless of whether it expresses an equivalency of barley with silver or silver with barley, equates one gur of barley to a shekel of silver. Nevertheless, although each of them arose out of activities of the provincial administration, only two may be said to share the same context.

LB 557 is “a balanced account of Madga barley” (nig₂-ka₂-ak še ma₂-ad-da-ga) from § 47 and has a related text from the same year, Nisaba 07, 10, which text is analysed and discussed at length by Heimpel (2009:33ff.). Heimpel’s analysis proposes that this latter text is a summary of the receipts of barley rations by their supervisors (ugula) from the Girsu administration for workers on mission to Madga. That document is compiled by a “scribe of the dock” Ur-Igalima, son of Atu. About 20% of the total barley received by the ugula remained unspent, as a “deficit” (la₂-ia₂). LB 557 probably complements Nisaba 07, 10 and possibly other similar but unknown texts as well. It is subscribed nig₂-ka₂-ak še ma₂-ad-da-ga (and explicitly) gir₂  ṣuš₂-ka₂-ke₂-ne “a balanced account of Madga barley via the overseers/supervisors of the workers” and records the return, via the ugula, of the barley previously unspent, in this case by each of them, to two persons who are officials of the provincial administration, nig₂-u₂-rum and ur₂-lamma. The two texts share several of the names of nine ugula and so may be complementary. Ur-Lamma receives two of the allocations in silver in lieu of barley, even though it is assigned from unspent barley. The barley:silver ratio in the one undamaged entry is 300 sila 3 per shekel. These are clearly accounts of the Girsu administration which paid each ugula the rations for their workers on a monthly basis, whether the workers were away on an assignment or not (Heimpel 2009:33). Rations which remained unpaid to workers were restored to the administration.

ASI 8,111, 29, much destroyed on the reverse, is “a balanced account of barley removed” (nig₂-ka₂-ak še kar-ra). 136130 litres of “barley removed from the Marsh field” (še kar-ra a-ša₂ ambar) via (gir₂) Ur-Nanše plus a much smaller “unspent” (la₂-ia₂) quantity of 837 ²/₃ litres is nearly all distributed (zi₂-ga) among a number of officials of the administration. One of these is the ensi₂ who receives (under his seal) 22 shekels of silver in lieu of 22 gur (6600 litres) at a barley:silver ratio of 300 sila 3 per shekel.

ITT 5, 06760 and ITT 5, 06776 are both receipts of barley for the bala and have a barley:silver ratio of 300 sila 3 per shekel: the first for 134 gur equivalent to silver of 134 shekels replaces a deficit and the second is for 60 gur equivalent to 60 shekels of silver.
**BBVO 11, 257, 4N-T197** is an annual account of the Inanna temple in Nippur for a specialised activity and possibly distributes available assets (sağ-nig₂-gur₃-ra-kam) of silver, barley and other commodities as cultic expenditure. Its function and content is discussed at length by Van Driel (1998:398) with some difficulty due to the extensive destruction of the obverse of the tablet. After the major expenditure of the assets, extra expenditure of commodities with a silver value of 60.03 shekels (ku₂₃-nig₂-di₃-ri₃-ga₃ “silver of the excess”) was made. 32.06 shekels were taken away (diri de₃-sa₂) and replaced with 12826 ²/₃ litres of barley at a barley:silver ratio of 400 sila₃ per shekel (1 gin₂ ku₃-babbar₃-a/1 1/barig 4/ban₂₃) še gur-ta₃/ab-si₁-gar₂/ša₁-ta₂-ta₂-zi₃, “400 litres barley to each shekel of silver has replaced it, it (the barley substitution) was deducted from the barley (component of the sağ-nig₂-gur₃-ra-kam)”).

The Nippur text, **NATN 605₃** is more of a curiosity. It records nine assignments of a total of 6610 litres of barley to nine separate individuals in Nippur month 12, perhaps just prior to the harvest. Four of these allocations are recorded with a silver equivalent (ku₂-bi₃) equal to 150 sila₃ of barley per shekel of silver. “Šeššešmu received the silver” (šeš-šeš₂-mu₃-ke₃₄/ku₂₃ šu ba₂-ti₃). A possible interpretation of the document is that it is an account of nine “harvest” barley loans with four of them bearing interest of 50% paid in silver, which Šeššešmu collected.

One of the ten Umma texts in Table 7 is explicit that barley is actually exchanged for silver, providing an unequivocal indication of the price of silver in terms of barley, indeed it is almost unique among all the texts collected in this study, in its relative unambiguity in this respect, with its sole companion being the Girsu text **CTNMC 5₃** which arguably witnesses an equally unequivocal description of an exchange of silver for barley. The Umma example, **YNER 0₈, 1₃**, is a “balanced account of silver of the governor” (nig₂-ak₂-si₃-enṣi₂-ka), one of the accounts kept by the major administrators of the province’s silver revenue and expenditure. The “debit” is revenues of the Umma administration and show silver incoming to the account from four transactions in three different years in which barley has been exchanged for silver (še ku₂₃-še₃₉ sa₇₀-a). The barley:silver ratio in each of these transactions is 350, 340, 300 and 255 sila₃ per shekel of silver respectively, with a text average, entered in Table 7, of 311 sila₃ per shekel. In addition to the silver from these four transactions, the revenue includes silver from an ugula of a mill which has replaced arrears in a tithe of the governor. Approximately two-thirds of this revenue is expended to pay for a copper standard under the seal of the governor. The unspent balance of silver (la₂-ia₃) remained to the account of the governor. The account was managed via Lu-kala, who as we have noted already was one of the four principal administrators of the province’s silver revenue and expenditure.

**RA 9, 1₅₈** may also record the receipt of silver revenue by an official of the Umma administration. As in **Nebraska ₄₄**, this text may register the collection of revenue by Dadaga, already identified as another of the principal administrators of the province’s silver. “Ten shekels of silver is placed in the account of Dadaga at Umma to be verified, its barley is ten gur₁ 10 gin₂ ku₃-babbar₂ ugu₂ da₃-da₂-ga₂/umma₃₂-a gar-ra DU igi kar₂₃-[kar₃]-dam /še₃ bi₂₁ 10 gur₂-am₃₂. The barley:silver ratio is clearly 300 sila₃ per shekel. The silver perhaps received by Dadaga is possibly a management in respect of grain products (Ouyang 2013:62). The document is “an account of groats on hand” nú₂₃-ka₃-ak ninda nú₂₃-gal₂₃-[la₃] /“of the temple of the Lady of Zabala (Inanna) in Apisal”₄ nin-zabala₄₃-a-[pi₄-sal₄₃]. Supposing that the extensive blank spaces on both the obverse and reverse of the tablet do not impact on the interpretation of the text, it would seem that 540 litres of groats on hand per annum were accumulated for a period of 17 years 5 months to provide “available assets” (sağ-nig₂-gur₃-ra-kam) from which (sa₃-bi-ta) the silver was placed to the account

[^40]: The translation of the reading ninda as “bread” in the neo-Sumerian period appears misleading. Most probably GAR represents a generic term for various types of groats (Damerow 2012:10 note 33).
one of the parties to the transaction could have taken the receipt home to Umma. For a translation of the text, see in u

Guedena in Umma and Apisal.

the king collected province's silver, Gududu, (nig

15 years later than Umma administration

father l

accountant”

certainly via trade through a merchant.

surpluses and deficits of silver which e

is significant here is the context within which the ratio arises.

obv. (i) 1

Arrears or a deficit of 8

shekel, though the quantities involved in the account are almost too small to merit a mention.

TCL 05, 6051

is an institutional account from Umma verifying a barley:silver ratio of 300 sila₃ per shekel, though the quantities involved in the account are almost too small to merit a mention. Arrears or a deficit of 8 ½ sila₃ of barley have a silver equivalent (ku₁-bi) of 5 grains of silver at obv. (i) 1-2, which is the same as one gur of barley is equal to one shekel of silver. However, what is significant here is the context within which the ratio arises. The text is a collection of several surpluses and deficits of silver which emanate from acquiring a wide variety of commodities almost certainly via trade through a merchant. The subscript of the text reads diri la₂-ia₁ ku₁ ga₂-ra//ilingual-nig₂-lagar-e dumu lugal-sag₁₀(IGLERIÑ_i)//giri ur₂šara₂ ša₁₃-dub-ba “accumulated silver surpluses and deficits (of) Lugal-Niglagare son of Lugal-saga via/under the authority of Ur-Šara, the chief accountant”. Although we don’t have an attestation that lugal-nig₂-lagar-e was a merchant, his father lugal-sag₁₀ possibly has 42 and that the merchants both received from and paid silver to the Umma administration out of their trading, is well established. Nisaba 26, 002, purportedly some 15 years later than TCL 05, 6051, is a silver account of one of the main administrators of the province’s silver, Gududu, (nig₂-ka₉-ak ku₃-ga//gu-du-du). In Nisaba 26, 002, obv. (ii) 15-16, lugal-nig₂-lagar-e dumu lugal-sag₁₀ is attested as repaying arrears of 15 shekels of silver which Gududu collected. The account lists silver payments Gududu received in respect of various taxes, to replace deficits in cash crops and animal husbandry, the provision of a gift of silver rings for the statue of the king in the temple of the god Šara and expenditure on cultic objects such as standards of Guedena in Umma and Apisal. 43

41 There is some doubt regarding the provenance of this text. Both CDLI and BDTNS databases query an Umma location, which has to be extremely doubtful given a month date of iti me-ki-gal, the fact that the person was bought in u-piš⁵ and the agreement witnessed and completed on the bank of the Diyala River (ga₂ i₆ dur-ul₃-ka). Of course, one of the parties to the transaction could have taken the receipt home to Umma. For a translation of the text, see Steinkeller (1989:321-2).

42 See MVN 03, 186 envelope obv. 3 kišib₁ lugal-sag₁₀ dam-gar₃ and JRAS 1939, 39 obv. 3 ki lugal-sag₁₀ dam-gar₃-ta.

43 Nisaba 26, 002 is discussed at length by D’Agostino and Pomponio (2014).
With the exception of the much broken and indecipherable **UTI 5,3497**, which has a barley:silver ratio of 260 sīla₂ per shekel, the remainder of the Umma texts in table 7 exhibit ratios which vary between 120 and 155 sīla₂ per shekel, a half or less of the assumed Ur III average. All are small texts. Two of them are identifiable as receipts but offer no possibility of suggesting why the ratio is what it is.

<table>
<thead>
<tr>
<th>Text sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenience</th>
<th>mean sīla₂/barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVN 6, 151</td>
<td>seal</td>
<td>n še gur lušu n gi₃-ta, ku₂-bi n gi₃, še zi₃, KA, [ki] PN1, PN2 šu-su-dam.</td>
<td>Girsu</td>
<td>120</td>
</tr>
<tr>
<td>LB 557</td>
<td>nig₂-ka₄-ak še ma₄-ad-da-ga, giri ugula erin₂-na-ka-ne</td>
<td>ša₄-bi-ta, la₃-ia, n gi₃ ku₄-babbar, še-bi n gur, PN šu ba-li,</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>ASJ 8,111 29</td>
<td>nig₂-ka₄-ak še ka₄-ra</td>
<td>ša₄-bi-ta, la₃-ia, n gi₃ ku₄-babbar, še-bi n gur, ki₃ši₃-bi, u₃u₂ PN ba₃-ga, zi₃-ga,</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>ITT 5, 06760</td>
<td>bala₃-se, giri PN3</td>
<td>n še gur lušu, ku₂-bi n gi₃, PN1 PN2 šu ba-li,</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>ITT 5, 06776</td>
<td>bala₃-se, giri PN3</td>
<td>n še gur lušu, ku₂-bi n gi₃, PN1 PN2 šu ba-li,</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>Nisaba 7,11</td>
<td>Totals silver and barley.</td>
<td>šu₃-ḫi₃nₙ₂ n gi₃, ku₂-babbar, ša₄-bi-ta, n še gur ku₄-bi n gi₃,</td>
<td>Girsu</td>
<td>300</td>
</tr>
<tr>
<td>NATN 381</td>
<td>date</td>
<td>n še gur // ku₂-bi n gi₃, PN1 PN2 šu ba-li,</td>
<td>Nippur</td>
<td>102</td>
</tr>
<tr>
<td>BBVO 11, 257, 4N- T197</td>
<td>nig₂-ka₄-ak e₃-inanna₃, ši₃-bi 12-am₃</td>
<td>si₃-zi₃-tu₃, [sa₃-ni₃]-gur₃-ra-kam, ša₄-bi₂ ta, zi₃-ga₂-am₃, n gi₃ ku₂-babbar, ši₃-de₃-nₙ₃, še-bi n gur, 1 gi₃ ku₂-babbar₃, ši₃-ga₂, n še gur, la₃-šu₂ PN ba₂-ta,</td>
<td>Nippur</td>
<td>400</td>
</tr>
<tr>
<td>TMH NF 1-2, 59</td>
<td>ki PN ba₃-zi₁</td>
<td>i₃-bu₂-e₂-ga₂, n še gur ku₂-bi n gi₃,</td>
<td>Nippur</td>
<td>242</td>
</tr>
<tr>
<td>NATN 605</td>
<td>total barley, date</td>
<td>n še gur lušu, ku₂-bi n gi₃ PN₃, ku₂₃ šu₂ ba₂-ta, šu₃-ḫi₃nₙ₂, n še gur.</td>
<td>Nippur</td>
<td>150</td>
</tr>
<tr>
<td>SAT 2, 33</td>
<td>date</td>
<td>n[bar₃₃] še, ku₂₃-bi n gi₃, la₃-ia, še zi₃-ga,</td>
<td>Umma</td>
<td>144</td>
</tr>
<tr>
<td>CST 721</td>
<td>ki-PN, kiši₂₃ PN3, (seal)</td>
<td>n[bar₃₃] še gur lušu, ku₂₃-bi n gi₃, sa₃-du₂, ša₂₃-sa₂, PN ba₂-ta</td>
<td>Umma</td>
<td>121</td>
</tr>
<tr>
<td>RA 9, 158</td>
<td>nig₂-ka₄-ak ninda₃ ni₃-ga₃-gal₃-[la₂], PN1 PN1, PN2</td>
<td>sa₄₃-gur₃-ra₃, ka₃, ku₂₃-babbar ugu; PN1 umma₃-a gur ra DU igi kar₂-kar₂₂-dam, še-bi n gur-am₃,</td>
<td>Umma</td>
<td>300</td>
</tr>
<tr>
<td>TCL 05, 6051</td>
<td>diri la₃-ia, ku₃₃-₃₃-ga₃-ra, PN1, giri PN3 ša₂₃-du₃-dub₂-ba</td>
<td>la₃-ia, n ši₃-₃₃, še, ku₂₃-bi n še// la₃-ia-am₃, diri...// diri-ga₂-am₃,</td>
<td>Umma</td>
<td>300</td>
</tr>
<tr>
<td>YNER 8, 21</td>
<td>zi₃-[ga]₃-am₃, date</td>
<td>ša₃-bi₂-ta, n še gur, ku₂₃-bi n gi₃,</td>
<td>Umma</td>
<td>250</td>
</tr>
<tr>
<td>YNER 8, 13</td>
<td>nig₂-ka₄-ak ku₂₃-ens₃-ka giri PN</td>
<td>n še gur n gur, ku₂₃-bi n gi₃, ku₂₃-bi n gi₃, še ku₄-ši₃, sa₃₂-a₂, la₃-ia, su₂-ga, ša₃₂-[bi]₂-ta, kiši₂₃, ens₃₃-ka,</td>
<td>Umma</td>
<td>311</td>
</tr>
<tr>
<td>AUCT 1, 330</td>
<td>date.</td>
<td>n še gur lušu, ku₂₃-bi n gi₃, ša₂₃-dib₂-ba</td>
<td>Umma</td>
<td>154</td>
</tr>
</tbody>
</table>
Variations in barley:silver price ratios

It is evident from the foregoing that the barley:silver price ratios vary considerably with both the geographic origin of a text and the administrative context in which these ratios occur, whether or not we understand them as prices or equivalents. The value of barley relative to silver arguably varies for quite other reasons than those of abundance or shortage due to natural events, or because of changes in the market and therefore the demand for and supply of one or the other of these commodities. The statistics of the distribution of the ratios collected in the Appendix, measure and locate this variation.

Of primary importance is to note the limited geographic coverage of the sample as well as the limitations imposed by its size. In total, there are merely 157 observations of the ratio in the data and these are witnessed in texts from only three provenances, Girsu (71 or 45%), Umma (59 or 38%) and Nippur (27 or 17%). The Nippur statistics, for convenience include the single observation from nearby Puzris-Dagan. Given that the Ur III state may have had some 19 core provinces covering a relatively large geographical area (Sharlach 2004:7-8), pretence that our data has any valid application statistically in discussing prices in the neo-Sumerian economy generally tends to the heroic.

The statistics at the foot of the Appendix list are equivalent to those derived by Snell (1982:147) for the whole distribution of prices for his “Grains”. The doubling of the sample produces small differences from his results but only in the mean of the distribution. In Snell’s terms, the overall mean of my distribution is 0.57 še of silver per sila₂ of barley (316 sila₃ per shekel) compared with his 0.62 (290 sila₁ per shekel). The median values of barley remain the same, 0.60 še per sila₁ or 300 sila₃ (1 gur) per shekel. The statistics also illustrates that the mode or most frequently occurring value is also 300 sila₃ per shekel increasing the probability that one gur of barley is equal in value to one shekel of silver. Of equal note, however, is the variability in the distribution of about 95 sila₃ per shekel as measured by the standard deviation. On the reasonable assumption that the real mean of the population of barley:silver ratios, as opposed to the sample mean, is equal to one gur per shekel, one standard deviation is equal to nearly a third of a gur.

The variability in the barley:silver ratio is significantly different in the sub-samples from each of the three Ur III provinces for which we have data. The sample mean in the Girsu data is 293 sila₁ per shekel, though the median and the mode values are both still equal to 300 sila₁ per shekel. However, the variability in the sample as measured by the standard deviation is much less at 33 sila₁ per shekel. The Umma data more closely reflects the overall statistics. The Umma mean is 312 sila₁ per shekel with a standard deviation of 99 sila₁ per shekel, again nearly a third of a gur. The median and mode values are both equal to 300 sila₁ per gur. On the other hand, the Nippur data presents a quite different picture from either Girsu or Umma. The mean is 387 sila₁ per shekel with a standard deviation of 150 sila₁ per shekel while the median and the mode are both 400 sila₁.

<table>
<thead>
<tr>
<th>Text sigla</th>
<th>Subscript</th>
<th>Indicative phrases</th>
<th>Provenance</th>
<th>mean sila₁ barley per shekel silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLB 03, 151</td>
<td>date.</td>
<td>PN1, ki PN2-ta, e₂-e₁-de₂, PN3 šu ba-an-ti.</td>
<td>Umma</td>
<td>150</td>
</tr>
<tr>
<td>UTI 5, 3497</td>
<td>še su-ga Profin1-a(k) Profn2₂ u₃ Profn3, kišib₂ še e₂-ta šu [su]-ba?</td>
<td>n še gur, ku₁-bi n gin₂, girl₁ PN</td>
<td>Umma</td>
<td>260</td>
</tr>
<tr>
<td>MAOG 04, 188.2</td>
<td>Purchase of Person with barley (witnessed)</td>
<td>n še gur lugal, ku₁ n gin₂ še-bi n gur.</td>
<td>Umma?</td>
<td>300</td>
</tr>
</tbody>
</table>

Table 7: Miscellaneous Silver or Barley Disbursements with barley or silver equivalent
per shekel, so that the Nippur distribution peaks at a point a third of a gur above the overall population mean.

The differences are best illustrated by the diagram in Figure 2. The bar chart compares the normalised distributions of the barley:silver price ratios for Girsu, Umma and Nippur by plotting the standardized or z-scores of each of the ratios.\(^44\) Such a distribution has a zero mean and one standard deviation above the mean is +1 and below the mean is -1. The zero mean is equivalent to a mean of 300 sila\(_3\) (one gur) of barley per shekel (gin\(_2\)) of silver. It is evident that the distribution of the Girsu price ratios peak at this average value. The majority, 65\%, of the Girsu ratios are 300 sila\(_3\) per shekel compared with only 31\% in the Umma data, the distribution of which nevertheless peaks at this average. The rather fewer Nippur ratios have none at this population mean. The Nippur distribution peaks with 41\% of cases at one standard deviation above the mean, which in the Nippur data is equivalent to 400 sila\(_3\) per shekel; a significant 33\% above the zero mean.\(^45\) The Nippur distribution can also be seen to have much greater variability than that in either the Girsu or Umma data, with as many as 19\% of cases at two standard deviations above the zero mean and some 15\% at about one and a half standard deviations below the mean. It is evident from the diagram that the next most and still substantially dispersed distribution is that of Umma, with the Girsu data showing much less variability.

The influence of context on variability

The differing administrative contexts and purposes of the accounts in which the barley:silver ratios occur, rather than abundance or scarcity, or the trading of barley for silver in a market system - even one characterised by barter - arguably determine most of the variations evident in the value of the ratios. The texts in the first four of these tables, predominantly if not entirely, recount the activities of the institutions of the provincial governments and are accounts kept by these institutions.

Tables 1 and 2 excerpt balanced accounts which record deliveries of barley from individuals, possibly farmers or sharecroppers among others, owed to an institution of government. The deliveries reduce deficits in barley remaining from previous years or are remittances required in the current year. Deliveries are often recorded as deliveries to replace arrears. The large majority of such deliveries are of barley, but a few repayments are made with silver in lieu of barley. Some of the accounts in Table 1 relate to deficits remaining and incurred by the activities of storekeepers of institutional facilities such as a flour mill, while in Table 2 the balanced accounts are related to the activities of named individuals or in one case those of the household of a major-domo. The latter also record deliveries of barley to the institutions and some of silver in lieu. 22 of the 23 texts in these two tables are from Girsu, the odd one out has a provenance of Umma. Only 6 of these texts do not register an average barley:silver ratio of 300 sila\(_3\) per shekel, and of those only two are as much as a barig (60 sila\(_3\)) less than this, while the remainder are half that amount away from the one gur per shekel mean. It is particularly noteworthy that the sole text from Umma in this category also records a barley:silver ratio of one gur per shekel. The institutional context for most if not all of these texts suggests that where barley was required to be delivered to the provincial administration and silver was accepted in lieu, the quantity of barley to be set against the deficit may have been fixed at this ratio. If so, it is likely that this “administered price” or equivalency was set by the provincial government.

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\(^44\) The small size of the sample does not really permit an accurate statistical application of this particular methodology. I have adopted the approach of standardizing the scores to produce an appropriate diagrammatic comparison of the variability in so called barley:silver prices.

\(^45\) Co-incidentally the rate of interest on a barley loan!
An equivalency of 300 sila₃ of barley per shekel of silver is also largely supported by the accounts detailed in Table 3. For the most part, these are accounts of allocations or “expenditures” from barley assets of the provincial institutions for a wide variety of purposes including the payment of taxes, interest on barley loans and field rents. Eight out of ten of the texts originate from Girsu and two are from Umma. Six out of ten record a barley to silver equivalency of 300 sila₃ per shekel including one of the Umma texts. However, the remaining four texts indicate more variability in the barley:silver ratio, for which in most cases it is difficult to offer an explanation.

Barley is the principal staple commodity supplied as “capital” or “available assets” by the provincial administrations to merchants, to acquire via them those commodities required by but not produced by the temples or other state institutions themselves. All but one of the sixteen “merchant accounts”, which supply barley to merchants as capital, emanate from Umma. The sole exception from Girsu, values the equivalency between barley and silver in a ratio of 300 sila₃ per shekel. Even though the balanced merchant accounts record only the expenditure of barley “assets” from surpluses produced by Umma institutions, considerably more variation exists in the barley to silver equivalencies in these texts. The values assigned to barley components of the sug₃-gur₁₁-ra in the Umma merchant accounts vary from 225 sila₃ per shekel to 420 sila₃ per shekel. Only eight out 22 of the Umma values are equal to 300 sila₃ per shekel. If we assume that the “administered” mean value of barley relative to silver was one gur equals one shekel in Umma as in Girsu, perhaps evidenced by the median value in the statistics, the barley:silver ratio in the merchant texts varies from 1¼ barig per shekel below this population mean to two barig per shekel above the mean although if outliers in the distribution are ignored it is evident from Figure 1 that the standard deviation is one barig per shekel. Thus, in the merchant texts the barley:silver ratio could have been equal to $1 \pm \frac{1}{3}$ gur per shekel. The Umma merchant accounts from which these data were extracted are from a 30-year period dated from Š 33 to SS 7 and it is also noticeable from Figure 1 that variations in the ratio are largely unsystematic.
The magnitude of these variations in the silver values of barley in the capital sections of the merchant accounts is not sufficiently large as to infer that the administration did not pursue a norm of one gur per shekel in its internal accounting systems. It may be that disbursements and acquisitions in the merchant accounts are valued in silver to iron out fluctuations in the staple surpluses expended to acquire commodities from the merchants. If the barley surplus available to exchange for other commodities, after internal institutional needs are satisfied in any one accounting period, was plentiful, the additional amount of silver required as “capital” would be lower and the barley per shekel would appear higher than 300 sila. Thus, the so-called price of barley would appear low. And vice versa, if the available surplus of barley was smaller than required to balance the silver value of commodities for which “capital” was exchanged, the balancing amount of silver required would be higher, the amount of barley per shekel would appear less than 300 sila, and the price thus higher. These variations might readily be administrative adjustments around the standard one gur per shekel and not determined in a market. Resources available to satisfy institutional demands for non-staple commodities can in this manner be stabilized. For such a mechanism to be effective, silver as well as barley needs to circulate as money as between institution, merchant and producers of commodities. But then we can readily assume it did, as proposed by Steinkeller (2004: 108), so that transfers of silver and commodities took place to “private” individuals, leaving them in possession of liquid funds to spend in local markets.

Frequent variations in surpluses probably depended more on shifting demands for rations to remunerate workers employed by institutions than on the occurrence or not of natural disasters. The overall level of demand for rations (wages) varied as a function of seasonal and other periodic changes in the level of labour requirements for different agricultural and other operations whereas the remuneration per person was unlikely to vary. The notion of the use of silver as a stabilizer to support the activities on behalf of the institutions by the merchants is credible in such circumstances.

Even allowing that different institutional organisations may have existed in Girsu and Umma, it is usually inferred that they standardised administrative and accounting systems. This inference is partly supported by the small Umma account Ontario 2, 442 in Table 1 and unequivocally by the exactly Umma-like balanced merchant account, MVN 11, 101, from Girsu in Table 4. However, there is a marked contrast in the nature of the accounts from the institutions of Girsu and Umma in our available data sample. The primary focus of the texts of Tables 1 and 2 is to register the deliveries of barley quotas due from their agricultural activities exacted by the institutions. These provide the barley incomes of the institutions for redistribution in rations and in other expenditures. Almost all of these texts are from Girsu. The majority of texts recording expenditures of barley and some silver in lieu of barley by institutions on state taxation and the cultivation of fields in Table 3 are from Girsu with only a couple from Umma.

It is only after the barley and other staples needed to satisfy these essential functions of the administration have been allocated that surpluses arise which can be used to acquire the variety of other luxury and day-to-day commodities required by the temples, palaces and other institutions of the Ur III state. An administered barley:silver price ratio of one gur per shekel may be much

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46 Steinkeller (1991:16-17) locates Šulgi’s administrative reforms to the second half of his reign, after § 21. Among these reforms were the creation of a unified administrative system for the whole of Babylonia; the introduction of the bala taxation system; the creation of a state bureaucratic apparatus and scribal schools with standardised training; the reform of the writing system; the introduction of new accounting and recording procedures and new types of archival records; the reorganisation of the system of weights and measures; the introduction of the “Reichskalender” which became official throughout the Ur III state, all of which created an apparatus which may have enabled the “administration” of prices.
more visible in the categories from Girsu defined by Tables 1-3, but exhibit more variability in the “capital” section of the merchant accounts from Umma for the reasons suggested.

The variability introduced into the distribution of price ratios by the Umma merchant accounts is substantially accentuated if ratios from silver loans to be repaid with barley and from receipts of silver with a barley equivalent are also included. This is not so of the Umma receipts, however. The majority of these are not associated with loans, but record silver received by the governing administration mostly at a barley:silver ratio close to 300 sila₃ per shekel. These loan and receipt documents are excerpted in Tables 5 and 6. Most of the loan documents originate in both Umma and Nippur, equal numbers of which stem from each place. The likely impact of these ratios on the overall variability in the complete sample is highlighted by the Nippur data. The distribution of the Nippur barley:silver ratios, even including four in the miscellaneous group (Table 7), has no observation at a mean of 300 sila₃ per shekel and exhibits a much greater dispersal in the ratios than either of the Umma or Girsu distributions.

Figure 2 clearly illustrates the dispersal created by the loan documents and receipts in the distribution of barley:silver price if it is assumed that the barley repayment is equivalent in value to the loaned silver. In other words, that there is no interest on the loan. A more reasonable assumption is that the loans in Table 6 are mostly “harvest loans” which incur a rate of interest. The average of the Nippur data is 400 sila₃ per shekel, a third higher than one gur is equal to one shekel, which is the 33% interest rate on a barley loan. However, the dispersal around this mean in the data is considerable and in some records the ratio suggests an interest rate of 20% appropriate to a silver loan. We noted earlier that penalty repayments of up to double the capital loaned may also contribute to the variability. For these rates of “interest” to apply, however, it has to assumed that the real barley to silver equivalent value or price ratio was the standard one gur per shekel, which contradicts the miasma of the low Nippur “grain” prices suggested by Snell’s analysis in his Table 6.

The miscellany of texts in Table 7 also shows wide variations in the barley:silver ratio. Except for one, the Girsu texts which are accounts from the institutions, produce a ratio of 300 sila₃ per shekel. The variability in the price ratio is greater in the Umma texts and is again more marked in the Nippur texts. Three of these texts perhaps merit further observations. The Nippur text from the temple of Innana, BBVO 11, 257, 4N-T197 values the barley:silver ratio at 400 sila₃ per shekel. Figure 2 shows this to be the same as the mean of the Nippur ratios, which gives pause for thought that the Nippur population average may actually be 400 sila₃ per shekel rather than 300, partially negating some of the arguments put forward in respect of the Nippur loan documents.

A second text of interest, MAOG 04, 188 2, is a receipt for 15 gur of barley paid to purchase a person. Its silver equivalent is given as 15 shekels. The document may flow from a transaction of a non-institutional household but nevertheless assumes a price ratio of 300 sila₃ per shekel.

Noteworthy in a discussion of the barley:silver price is the Table 7 text from Umma, YNER 08, 13 a balanced silver account of the ensi₂. This is possibly a second example among the 157 texts examined in this study, which explicitly describes quantities of barley from three successive years as “barley exchanged for silver”, though CTNMC 53 more laconically defines the exchange simply as “barley for silver”. The four barley:silver ratios are 350, 340, 300 and 255 sila₃ per shekel or 1 gur ± 5 ban₂ per shekel.

Some preliminary conclusions
A cursory view of this analysis might conclude that, irrespective of a doubling of the size of the sample of barley:silver prices, does not differ from Snell’s 1982 finding with respect to the price of “grain”. Rather, it might be said to replicate his overall result. The median value of one gur
barley per shekel of silver is here the same as that in his earlier study. Further, the most frequent value in the data, the mode, is the same at one gur per shekel. The average values are little different. Snell decided that his median values were more appropriate as a measure of prices than the mean and that the median value of one gur per shekel was the price of barley.

However, this was simply a statistical measure of central tendency in a widely dispersed distribution in the light of which Snell disputed Maurice Lambert’s proposal that there was a fixed ratio between silver and barley. He was unconvinced that, in view of the many deviant prices even in official documents, such a ratio was either promulgated by the state or sanctioned by tradition (Snell 1982: 185). Nonetheless, that the institutional implementation of a fixed bi-monetary price ratio or equivalency of one gur of barley per shekel is essential to the administration of the Ur III state economy as a foundation to most commodity prices, remains the view of scholars such as Englund and Hudson inter alia. Significant misgivings surround this view nonetheless, even among those who espouse it. These are generated by the variability in the barley:silver ratio in many documents and, like Englund, we can often only speculate as to its causes. However, it is evident from this study that much of this variation is inculcated by the incompatible geneses of the source data.

An initial constraint in all Ur III data related to commodity values or prices is that imposed not only by the limited size of the data samples which can be collected, but also by bias built in by the distribution of tablet provenances and of their purposes in the whole of the Ur III corpus. Compounding the difficulties of the small size of a geographically skewed sample, the most explanatory source of the variability in the barley:silver ratio derives from the differing contexts in which they occur. These contexts are different with regard to the function of the accounts and other documents in which transactions in barley and silver are recorded and to whether or not either barley or silver is a unit of account or a payment in lieu. Texts can be assembled into a contextual typology of the barley:silver prices into which all but a minority can be classified. This categorisation of the texts reveals further biases in the sample of price ratios. The asymmetrical contexts of the sample are broadly coincident with its geographical skewness.

Three groups of texts have provenances almost entirely from Girsu. These are concerned with either the delivery of barley to institutions or the disbursement of barley from them. Each contains either a delivery or an expenditure of silver in lieu of barley. In these accounts the unit of account is barley. Payments are in silver, the barley equivalent (še-bi) of which is used to convert the silver to barley for accounting purposes. Only two or three texts are from Umma. No other province of the Ur III state is represented in these texts. In the first two of these groups the barley:silver ratio, with few exceptions, is 300 sila per shekel. In the third, 300 sila per shekel is again predominant, although there is some fairly insubstantial variation from it.

In contrast, the merchant accounts, excepting one from Girsu, emanate from Umma. Since these accounts are balanced in silver, the unit of account is silver (ku-bi) and is used in the valuation of the commodities acquired from the merchants as well as in the conversion to a silver value of surpluses of staples expended to acquire these commodities. The variations in barley surpluses remaining after the demand for barley within the internal institutional economy had been met, probably explains the departures from what may have been an administratively fixed norm of 300 sila of barley per shekel, a ratio which certainly did occur in the merchant accounts. It might be asked whether this value would appear randomly from market feedback in such a small sample of these texts, in one, let alone in eight out of 22 observations.

The loan documents are also lumpily distributed geographically. Their provenances are almost equally shared between Umma and Nippur. All of these describe silver loans to be repaid in barley. In these še-bi does not represent a unit of account but indicates that the loan is to be redeemed.
with a payment of barley. The widely dispersed values of barley per shekel may reflect different rates of interest and penalty payments. The loan documents are best omitted from the data as a barley:silver ratio estimated from them is unlikely to be a measure of barley prices or equivalencies. We can only make sense of them if we assume that the value of barley is 300 sila per shekel. It then is possible to compute interest rates and penalty payments. To assume that the data measures a barley:silver ratio or a price introduces a great deal of unlikely variance into the overall distribution. Similar arguments apply to receipt documents, though not to the institutional receipts from Umma, and even though we lack the obvious reassurance in those that barley is to repay silver. Their geographical distribution largely replicates that of the loan documents.47

Perhaps twelve from 20 texts in the miscellaneous set of texts are accounts from institutions and of these some seven testify to barley:silver ratios of 300 sila per shekel. The majority of these are accounts of Girsu institutions. Seven of the remaining eight texts have very low ratios, which if interpreted to be prices would suggest very high barley prices indeed. Most of these texts were beyond my construal but it remains doubtful that these ratios represent prices. Such prices are even less likely when a possible non-institutional text of uncertain provenance records the purchase of a person for a quantity of silver with a barley equivalent of 300 sila per shekel. The majority of the texts in this miscellany reinforce the probable existence of administered prices at this fixed rate.

In summary, there are several general conclusions to be drawn from this study. Although as scholars have observed, there is no apparent evidence in the Ur III texts of an explicit decree that a barley:silver price ratio was fixed at one gur per shekel, it seems clear from the barley accounts which comprise the large majority of Girsu texts, that barley primarily functions as the unit of account and where silver was paid in lieu of barley it was valued at one gur for each shekel. This ratio was a barley:silver equivalency no different from that argued by Polanyi or Hudson’s bimoneyary price ratio, fixed and administered by the Girsu institutions.

How far the governmental use of this equivalency can be asserted to extend beyond the Girsu institutions is almost another argumentum ex silentio. The bulk of the texts from Umma in this collection are a quite different animal from the Girsu barley accounts. The Umma texts are divided between the merchant texts and silver loan documents and receipts. While the merchant texts are obviously accounts kept by the Umma provincial administration the price ratio can only be computed from the barley surpluses via a silver unit of account entered in the “debits” or “capital” section. The loan and related receipt documents should be discounted from consideration. Evidence from receipts of silver by the Umma institutions, however, indicates ratios compatible with a decreed barley:silver price ratio.

There is little evidence at all in these texts for the direct exchange of barley and silver, let alone in a manner which would testify to the determination of barley or silver prices in a market. Only two texts, one from Girsu and one from Umma, record transactions which involve the direct exchange of barley for silver. In both instances these describe the acquisition of quantities of silver by the palace for quantities of barley. The consequent barley:silver ratios might be deemed prices but it remains difficult to argue that they were determined by the laws of supply and demand. The Girsu

47 If the loan documents and receipts are omitted from the sample, the mean barley:silver ratio for the whole study area is reduced from 316 sila per shekel to 281 sila per shekel. The median and the mode stay the same at 300 but the std. dev. in the ratio reduces from 95 to 57 sila per shekel. The variability around 1 gur per shekel reduces from \( \pm \frac{1}{5} \) gur to \( \pm \frac{1}{5} \) gur. The Nippur data in the distribution essentially disappears, the picture in Girsu is largely unchanged while the reduction in the overall variability in the data is mirrored in the Umma distribution, in which the mean reduces from 312 to 277 sila per shekel, the median and the mode are both 300 and the std. dev. reduces from 99 to 67 sila per shekel. The Umma data remains considerably more dispersed than the Girsu distribution mainly because they arise from different contexts.
price ratio is consistent with the notion of a standard administered price, while the Umma range suggests that even if barter produced some variation in the settled price, the target price in such exchanges was the standard price ratio.

The data we do have, though skewed and partial, would suggest that the Ur III administrations may indeed have adopted a bi-monetary price ratio as a norm with which to value transfers in internal systems. How much the possibility of such a norm helped influenced the level and structure of prices of other staple and non-staple commodities is a subject for further study.
Table 2. Silver receipts with barley equivalent

Table 3. Expenditures from barley assets on the bala and other

Table 4. Loans of silver with repayment in barley

Table 5. Loans of silver or barley disbursements with barley or silver equivalent

Table 6. Silver receipts with barley equivalent

Table 7. Misc. silver or barley disbursements with barley or silver equivalent

Table 8. Loans of silver or barley disbursements with barley or silver equivalent

Table 9. Silver receipts with barley equivalent

Table 10. Loans of silver with repayment in barley

Table 11. Loans of silver with repayment in barley

Table 12. Loans of silver with repayment in barley

Table 13. Loans of silver with repayment in barley

Table 14. Loans of silver with repayment in barley

Table 15. Loans of silver with repayment in barley

Table 16. Loans of silver with repayment in barley

Table 17. Loans of silver with repayment in barley

Table 18. Loans of silver with repayment in barley

Table 19. Loans of silver with repayment in barley

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Table 21. Loans of silver with repayment in barley

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Table 71. Loans of silver with repayment in barley

Table 72. Loans of silver with repayment in barley

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Table 76. Loans of silver with repayment in barley
<table>
<thead>
<tr>
<th>Location</th>
<th>Reference</th>
<th>Value</th>
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<tr>
<td>Undated (Umma)</td>
<td>UTI 5, 3497</td>
<td>še-bi 260</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
</tr>
<tr>
<td>Undated (Umma)</td>
<td>Ontario 2, 442</td>
<td>še-bi 300</td>
<td>Table 1. nig₂-ka₂-ak si₂-tum: silver paid in lieu of barley delivery</td>
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<tr>
<td>Undated (Nippur)</td>
<td>TMH NF 1-2, 59</td>
<td>ku₂-bi 226</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
</tr>
<tr>
<td>Undated (Nippur)</td>
<td>TMH NF 1-2, 59</td>
<td>ku₂-bi 258</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
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<tr>
<td>Undated (Nippur)</td>
<td>NATN 605***</td>
<td>ku₂-bi 150</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
</tr>
<tr>
<td>Undated (Nippur)</td>
<td>NATN 605***</td>
<td>ku₂-bi 163</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
</tr>
<tr>
<td>Undated (Nippur)</td>
<td>NATN 605***</td>
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<tr>
<td>Undated (Girsu)</td>
<td>Nisaba 7.11</td>
<td>ku₂-bi 300</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
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<td>Nisaba 7.11</td>
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<td>Mean 316</td>
<td>Table 7. Misc. silver or barley disbursements with barley or silver equivalent</td>
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</table>

Standard Deviation 95
Median 300
Mode 300

*** denotes texts also present in Snell’s table 6.
BIBLIOGRAPHY

Brunke, Hagan and Sallaberger, Walther

Champ, Bruce and Freeman, Scott

Civil, Miguel

Cripps, Eric L.
2014 “Money and Prices in the Ur III Economy of Umma”. WZKM 104; 205-232.

D'Agostino, Franco and Pomponio, Francesco

Dahl, Jacob


Dale, Gareth
2013 “Marketless Trading in Hammurabi’s Time: A Re-appraisal”. JESHO 56; 159-188.

Damerow, Peter

de Maaijer, Remco
1998 “Land Tenure in Ur III Lagaš”. In Bernhard Haring and Remco de Maaijer, Landless and Hungry? Access to Land in Early and Traditional Societies. (Leiden; Research School CNWS School of Asian, African and Amerindian Studies), 50-73.

Englund, Robert K.
1990 Organisation und Verwaltung der Ur III Fischerei. BBVO 10. (Berlin; Deitrich Reimer Verlag).


Garfinkle, Steven J.  

Gomi, Tohru  

Heimpel, Wolfgang  

Hudson, Michael  

Jevons, William Stanley  
1875 *Money and the Mechanism of Exchange*. (New York; Appleton and Co.)

Kiyotaki, Nobuhiro and Wright, Randall  
1989 “On Money as a Medium of Exchange”. *JPE* 97 (4); 927-954.

Lafont, Bertrand and Westbrook, Raymond  

Lafont, Bertrand  

Maekawa, Kazuya  

Moliña, Manuel  

2016 “Archives and Bookkeeping in Southern Mesopotamia during the Ur III period”.  

Ouyang, Xiaoli  
2013 *Monetary Role of Silver and its Administration in Mesopotamia during the Ur III Period (c. 2112-2004 BCE): A Case Study of the Umma Province*. BPOA 11. (Madrid; Consejo Superior de Investigaciones Científicas).

Potts, Daniel T.  
Powell, Marvin A.


Prentice, Rosemary

Sallaberger, Walther


Sharlach, Tonia.
2004 *Provincial Taxation in the Ur III State*. (Leiden and Boston: Brill•Styx).

Snell, Daniel C.


Steinkeller, Piotr


Van Bavel, Bas

Van Driel, G.
1995  “Nippur and the Inanna Temple during the Ur III Period”. JESHO 38, 393-402.

Widell, Magnus


Wielke, Claus.

Wu, Yuhong
2002  “The Calendar Synchronisation and Intercalary Months in Umma, Puzriš-Dagan, Nippur, Lagash and Ur during the Ur III Period”. JAC 17, 113-114