



## Review Article

# Early weight systems, markets and trade

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The dominance of economics in shaping the modern world has encouraged scholars from diverse intellectual backgrounds to explore and interpret the evidence for exchange, merchants and markets in the distant past. Urban, state and pan-continental trade systems and networks were developed and in use for thousands of years before the emergence of coins in the early first millennium BC in Anatolia, India and China. In the absence of coins, there is at least some reassuring evidence—especially for historians and economists—when written records detailing goods and transactions are discovered and translated. However, while these sources are invaluable, the majority of the early trade and exchange between individuals and groups across the world is visible only in the archaeological record. The sheer scale, complexity and distances revealed, even for some small village-based agricultural groups, highlights that there was widespread co-operation, but also raises the question of how such exchanges could have occurred. It is in this space that the frequently neglected—and sometimes maligned—study of early metrological systems and weight use can be best appreciated.

In the past two decades, there has been significant increase in scholarship relating to early weight systems, especially across Southwest and South Asia, the Mediterranean and Europe. This is within a broader intellectual context that ranges from research on the archaeology of measurement (e.g. Morley & Renfrew 2012; Dzbyński 2023) to the theoretical frameworks

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and applied modelling of early economics (e.g. Dow 2022; Ialongo & Lago 2024). The three volumes under review arose from one large European Research Council funded research project at the University at Göttingen led by Lorenz Rahmstorf entitled *Weight metrology and its economic and social impact on Bronze Age Europe, West and South Asia*.

The first volume on *Weights and marketplaces* is a collection of 23 chapters derived from two workshops seeking insights into how weights, weighing systems and marketplaces in the past can be identified and interpreted. The book is divided into two sections reflecting the focus of each workshop. There is a refreshing introduction to each section which, rather than seeking to trace an intellectual lineage, outlines clear and precise sets of questions grouped under different themes that provide both the framework for the authors in preparing their papers and help to guide and stimulate the reader. The questions posed address the identification and metrological analysis of weights as well as weight-regulated artefacts and the economic, social and political implications involved.

The book begins with an insightful and cautionary chapter by Karl Petrusco arguing against tempting notions of an early universal weight system, memorably described as ‘Bronze Age theory of everything’, and highlights instead the importance of understanding systems of conversion. The potential evidence for very early weighing systems is explored at Tepe Gawra, Iraq, by William Hafford who presents the possibility of weights and weighing being in use at the end of the fifth millennium BC. By the third millennium BC, weight-orientated commercial connections spanned Mesopotamia/Syria, Iran and the Indus Valley; Enrico Ascalone presents and contextualises evidence from Shahr-i Sokhta, Iran—in addition to authoring the third volume under review. A fundamental point in understanding the recording and interpretation of the transactions involved is made by Lionel Marti and Grégory Chambon. Their integrated textual and archaeological analysis of the Old Babylonian and Middle Assyrian evidence from the second millennium BC demonstrates that, while mass was indeed measured, the records by administrators are ambiguous as to whether they are referring to actual mass or a nominal value. What was actually being weighed and the extent to which it can be compared in the textual and archaeological evidence varies significantly according to surviving evidence.

The processes of weighing and trading of metals—especially silver—dominate the debates across Bronze Age Southwest Asia. Luca Peyronel explores in detail the weighing of silver in the early second millennium BC in the region, arguing persuasively that at major sites such as Ebla, Syria, silver fragments (hacksilver) were deliberately prepared in order to be convertible across systems in different areas. This exploration of the widespread use of hacksilver and extent of regulated weight systems is echoed in Jane Kershaw’s exploration of weights in the Early Medieval Viking world. There are challenges to establishing the relationship between weight and value in the past, not least due to difficulties in ascribing a relative or absolute value without detailed textual evidence as well as the complexity of variations that would cause values to fluctuate. Anna Michailidou evaluates the connections between weights and value in the mid–late second millennium BC Aegean and compares not only different metals (copper, gold, lead and silver) but also fleeces and grain. Perhaps most importantly, the chapter highlights the importance of looking beyond formal bullion standards and instead looking at customary standards that would have been acceptable in transactions. These can be identified statistically as standard average quantities and would have

functioned as convenient and tradeable quantities of mass. Nicola Ialongo and Lorenz Rahmstorf examine the evidence for weights and weighing from the mid-second to the early first millennium BC across Europe, identifying five shapes that can be grouped quantitatively using frequency distribution analysis and cosine quantum analysis. This research contrasts with the majority of the chapters in focusing on small-scale and non-literate agricultural societies which has important implications for the early pan-continental economic systems. It will be expanded upon in the soon to be published fourth volume in this series (Ialongo *in press*).

The shapes of the weights featured in the chapters range widely, from cubical to rectangular forms, from discs to domes, from cylinders to cones and come even in the shapes of animals and birds. The weights are carefully shaped mainly from metals and stones—ranging from colourful agate to dull lead. Weight assemblages from single sites can be strikingly extensive—for example, the Ulu Burun shipwreck off the coast of southern Türkiye, from the late fourteenth century BC, alone contains 103 stone, 38 bronze and eight lead weights and reflects different scale sets. The various units and terminologies (e.g. minas and shekels) of the weight systems in the chapters—and their potential compatibility—reflect a complex diversity of overlapping regional systems, with standard weight measurements ranging from 8g to 1.7kg and over.

This reflects multiple entangled economic entities, rather than a universal standard or system, whose ability to trade and exchange goods over vast areas was due to the convertibility of the weights and values, with additional variations according to the goods (e.g. metals, textiles, timber, oils etc.) being exchanged. International trade networks from Anatolia and Egypt in the west to the Indus valley in the east were likely fully operational in the later fourth millennium BC (see Steinkeller's chapter in the second volume) providing the context both for the emergence of the weights and the marketplaces.

The second half of the volume is dedicated to the identification, analysis and interpretation of marketplaces in the archaeological record. While undeniably related to weights and weighing systems, the difficulties involved in answering the detailed list of questions posed by the editors are far greater. Yet, many of the authors consistently rise to the challenge, perhaps none more so than David Warburton in a substantial chapter on the ancient Egyptian economy from c. 3000–1200 BC within the context of contemporary Near Eastern economies. In an intellectually wide-ranging narrative, he postulates how the overwhelming dominance of the early state and its requisite bureaucracy meant that precision in weighing goods such as metals and grain was fundamental. The bureaucrats, however, aimed primarily to control and manipulate costs—holding them down where possible—and it is within this context that the emergence of the marketplace and merchants operating within and beyond these confines in ancient Egypt and the Near East should be understood. The growth of marketplaces at sites within and connecting in expanding trade routes can be seen at Heracleopolis Magna, Egypt, in the late third millennium BC in a stimulating case study by Juan Carlos Moreno García. The challenge of evaluating the linguistic evidence for a marketplace against the archaeological evidence is taken up by Adelheid Otto who presents several potential examples from extensively excavated sites across second millennium BC Syria and Mesopotamia. The amount of goods traded along routes and in marketplaces is notoriously difficult to evaluate but in drawing on the detailed textual evidence at Kültepe (ancient Kanesh), Edward Stratford provides a narrative for major centres in central Anatolia in the

early second millennium BC. Moving into the first millennium BC, insightful and detailed chapters by Edward Harris (on marketplaces in Greece) and by Elizabeth van der Wilt (on Egypt) demonstrate clearly how the evidence for definable marketplaces varies from widespread in the former to elusive in the latter. However, in both states, it is clear that the marketplace needs to be understood within the context of religious and political institutions. Three chapters on markets in Medieval Northern Europe highlight the importance of major, published excavations as at Cologne, Germany (Höltken), and how these excavations can be integrated to understand Medieval markets and merchants (two chapters by Rösch) whose activities led to the development of these major urban trading centres (Dijkman). The marketplaces of pre-Hispanic Mesoamerica (Kowalewski) and specifically the Aztecs (Hirth) provide stimulating perspectives that differ from the Euro-Asian approach and, unfortunately, represent the only ones on the Americas in the three volumes. The different temporal perspectives from which marketplaces can be understood are seen in the contrast between the *longue durée* relationships between settlement, trade and demographic growth in coastal Shangdong, East China, by Gary Feinman *et al.* and the ethnographic research exploring concepts and practices of contemporary markets in West Africa by Hans Peter Hahn.

The second volume on *Merchants, measures and money*, which comprises 19 chapters, arose from a further two workshops and it has a similarly spectacular breadth with case studies from across Bronze Age to Early Modern Afro-Eurasia. As in the first volume, there are also two useful, detailed and clearly organised sets of questions to frame the debates around weights and merchants and then around weights and money. The first chapters build on these questions and focus on: the technologies of counting, recording and measuring; the socioeconomic organisation of traders and trading places; and the terrestrial and maritime technologies of mobility and associated infrastructure. The chapters range from the third and early second millennium BC trading networks in Southwest Asia, with notable chapters drawing on textual archives excavated at Ebla (Steinkeller) and Kültepe (ancient Kanesh; by Barjamovic) to provide detailed frameworks and narratives on trade networks and goods from timber to tin. Where comparable textual evidence does not exist, as in Europe in the second millennium BC, there is much strong emphasis on distribution of raw materials, artefact types and activity along riverine and terrestrial routeways; the importance of fieldwork where raw materials are extracted as well as at major geographical and cultural boundaries and buffer zones is evident (Harding & Mordant *et al.*). Individual merchants feature relatively rarely in the volumes—though the account of Laelus Cosmos and his impact on the trade through the Red Sea ports of Berenike and Myos Hormos in the early Roman Empire by Rodney Ast means that we cannot simply ignore the potential impact of these entrepreneurs for a lack of evidence. What is especially noteworthy is the consistent demonstration across space and time of extensive and even pan-continental trading networks in the apparent absence of centralised authority or regulation. The widespread presence of small-scale social and political networks overlapping with one another and underpinned by a myriad of technologies encompassing mobility, metrology, accountancy and communication is evidenced in Medieval times from the North Atlantic (Jahnke, Mehler & Gardiner) to the Indian Ocean (Lambourn).

The second part then explores the evidence and interpretations of money in terms of the materiality, unitary value and relationships to the broader communities of users and the state.

In an important contribution by François Velde, the understanding of money is seen within the context of the transaction by creating an agreed medium for the participants involved. However, the basis for the transaction agreement is not always distinguishable and could relate to: political authority as is widespread in the modern world (known as fiat currency); the implicit agreement between participants (fiduciary currency); or the market value of the material from which the money is made (commodity currency). Societies can certainly exist without money and its use therefore needs to be seen as a convention for transactions. Money is a solution whose implications have then led to further conventions. In a standout and highly stimulating chapter, Alain Besson explores the emergence of metallic currencies before coins comparing Europe and China, making the case for a wide range of fiduciary currencies in metal at both ends of Eurasia long before political authorities created fiat currencies. This use of metal currency before coins is further explored in stimulating detail in the Aegean from c. 1400–600 BC by Julien Zurbach and c. 1925–1710 BC in the Old Assyrian trade networks in Anatolia by Jan Dercksen. Sibel Kusimba and Chapurukha Kusimba demonstrate that in East Africa from the later first millennium to the sixteenth century AD, multiple monies could co-exist within the same economic systems. The authors highlight a wealth of case studies from different societies and regions encompassing explorations of coins, cowries, metals and bark cloth among other currencies. The importance of understanding systems of conversion and the abilities of individuals, communities and marketplaces to embrace the complexities of different languages, weights and currencies cannot be overstated and it is demonstrated in chapters as diverse as Venetian trade in Mamluk Alexandria (Christ) and Viking merchants within and beyond the Muslim Caliphate (Kilger). How societies understood and experienced monetisation is tantalisingly difficult to explore and is frequently either ignored or left to speculation but the chapters on silver and Classical Athens by Gareth Dale and especially on coins and metal value at Campania in the fourth to first centuries BC by Clive Stannard shows how assumptions can be challenged and new ideas proposed.

The third volume *Bronze Age weights from Mesopotamia, Iran and the Indus valley* is a meticulous catalogue encompassing Bronze Age weights from Susiana and Mesopotamia, the Iranian highlands and the Greater Indus Valley. The vast majority of these weights have never been published and many are from museums and institutions that are not always, or rarely, accessible to international scholars. The catalogue encompasses 2058 weights from 24 sites contained within 22 museums and Directorates of Antiquities, all of which Enrico Ascalone visited for first-hand recording over five years. Notably there are 869 from Dholavira, India, and 746 from Susa, Iran. There is consistent and robust source criticism of these widely dispersed finds of weights, both in terms of chronology and archaeological context. The style of recording the weights is coherent and clear in text and in photographs which crucially enables side by side comparisons throughout the catalogue but also to corpora elsewhere. There are 29 weight inscriptions on 20 weights with a translation chapter provided by Jan Tavernier. The primary aim of the monograph is to publish the recorded weights with the full implications of the evidence to be realised in future publications. The author lists 15 points that will be developed and there are doubtless many more that readers will develop in their own scholarship. The monograph nonetheless highlights that there were two weight systems in the second half of the fourth millennium BC: handbag shaped weights from the Halil Valley to Margiana and Bactria; and pear-shaped weights in Baluchistan and along the

Indus Valley. In the first half of the third millennium BC, two different typological spheres can be observed for heavy materials such as tin, silver and lapis lazuli. The detailed spatial and chronological evaluation of the weight assemblages, especially at the Harrapan site of Dholavira, provide invaluable and important insights. These range from evidence showing the use of weights such as pebbles and clay objects at all societal levels of Indus Valley society. It also highlights the close connections between weight systems in third millennium BC Syro-Mesopotamia and the Indus Valley, though highlighting many questions that now need to be explored. This third volume in particular will be consulted and referenced for decades. A fourth volume is to be published imminently which covers the Bronze Age weight and balance evidence across Europe beyond the east Mediterranean and is outlined in Chapter 8 in the first volume (Ialongo & Rahmstorf). The volume will deliver a detailed catalogue and drawings of 696 weights and 18 balance beams together with up-to-date and stimulating quantitative and qualitative analyses and interpretation of the evidence. Taken together, the third and fourth volumes represent the foundations for a new understanding of Bronze Age economics whose implications are only starting to be appreciated (e.g. Ialongo *et al.* 2021).

The reviewed volumes lay down the theoretical and methodological agenda for the next generation of scholarship on early weight systems, markets and trade. The coherency and clarity of the vision and tight editorial organisation is excellent—and for scholars of Europe, the Mediterranean and Southwest Asia in particular, these volumes are essential. While there are chapters on the Indian Ocean, China, West Africa and Mesoamerica, they are very much in the minority so a more global perspective is still required.

The predominant temporal focus is on the Bronze Age and the Medieval periods with relatively few chapters covering the later first millennium BC and earlier first millennium AD. The Greek and Roman economies, which typically receive the vast majority of scholarly attention, especially from modern economists and historians seeking a *longue durée* perspective, feature only occasionally. The bold editorial decision to go beyond the traditional Classical and numismatic borders by focusing mainly on periods and societies without coins and with no or few relevant textual records has led to a far more stimulating and fascinating collection of contributions. The three volumes emphatically make the case for the fundamental importance of weights and weighing systems whose temporal depth and spatial reach goes far beyond early coins. What had been a neglected area of research is now thriving—and for historians, economists, anthropologists as well as for archaeologists, this is a welcome development. There is no shortage of potential new scholarship.

In addition to weights and weight systems, the past two decades have seen a dramatic transformation in the evidence relating to the pan-Eurasian movement of plants, materials, technologies, people, languages and ideas during the third to early first millennium BC. Yet, the debates and interpretative narratives as to how and why these movements occurred and the resulting socioeconomic impacts remain fragmented by region as well as by sub-discipline. While frequent, if vaguely defined, analogies are made to historical Silk Roads (see Franklin 2024 for a review) and theoretical frameworks from early modern world systems to globalisation theory have been fruitfully explored across the third to first millennia BC (e.g. Vandkilde 2016; Beaujard 2019), this reviewer argues that both the immense scale and the significance of this pan-Eurasian connectivity is not yet well understood. For example, how do we start to explain that tin from south-west England is being found in shipwrecks off the



coast of Israel from the fourteenth/thirteenth century BC (Williams *et al.* [in press](#)), while at the same time along the same coastline, sesame, soybean, banana and turmeric from South Asia, and potentially beyond, were being consumed (Scott *et al.* [2021](#))? There is no recent major synthesis of pan-Eurasian trade in the third to early first millennium BC, in stark contrast to multiple weighty tomes and lively debates spanning subsequent periods (see Cobb [2023](#)). This pan-continental intellectual vacuum left by the majority of archaeologists has been enthusiastically filled by scientists in ancient DNA with accompanying models of population migrations, mixing and replacements (e.g. Allentoft *et al.* [2024](#)). However, neither genetic ancestry nor demographic modelling can provide anything more than a partial explanation at best for the emergence of the long-distance trade systems and connections observed. It is in evidence such as the weight systems, marketplaces and merchant networks revealed in the three volumes under review that the foundations for future scholarship are to be found. Given the pan-Eurasian mobility and exchange networks under discussion, there is immense potential to explore how far early weights and weight systems can be traced back and evaluated in Bronze Age Central and East Asia, especially in the second millennium BC.

While the current debates on what was being weighed and traded are dominated by precious metals such as gold and silver and precious stones such as carnelian and lapis lazuli, the evidence for the contemporary long-distance trade in Bronze Age organic goods from pepper to ivory and from textiles to fruits is rapidly growing. It is highly unlikely that these goods remained unweighted when being exchanged. Estimating the frequency and scale of consumption based only on specific and fragmentary case studies is difficult in the absence of contemporaneous detailed written records. When considering the distances and logistics involved, this has understandably led to more minimalist interpretations of trade, orientated around small, easily transportable and rare luxuries only available for elites. Yet such frameworks are unable to explain how from the mid-second millennium BC onwards, tin-bronze is widely available as tools, weapons and ornaments to societies spanning the Atlantic to the Pacific oceans. The only accessible and exploited sources of tin that would have been sufficient to supply all the communities ranging from villages to states in this landmass are either found in Central and Western Europe or in Central Asia, both thousands of kilometres from any Bronze Age state or urban centres (see Vandkilde [2016](#); Williams *et al.* [in press](#)). By any estimation based on the output of all known Eurasian Bronze Age–Early Iron Age copper mines or bronze metalwork recovered, hundreds of tons of tin and/or tin-bronze would have been frequently moved through established networks of merchants and markets over long distances across land, over sea and along rivers before reaching centres ranging from Mycenae to Anyang.

Weight systems and weighing would have been fundamental to the multiple transactions that the tin and other goods would have been involved in across the societies living along these routeways, the majority of whom did not use writing and are absent in the surviving written records of the urban and state societies living far away. What is currently lacking is not just a deeper understanding of the weights but the economic, social and/or political value gained by the communities involved from the emergence and growth of this vast trading network that might provide insights into their motivations. While the importance of social relations should not be underestimated given the complex webs of trust and understanding involved and assumed projections of the modern world onto the distant past should be avoided (cf. Brück [2024](#)), when patterns in the European Bronze Age metalwork used by small-scale

agricultural societies reveal not only parallels with Roman coins but also with modern economic behaviour, it is not a coincidence (Ialongo & Lago 2024). The future of the economic past is again an exciting place to be.

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