The Valuation of Coins in Medieval Jewish Jurisprudence

BY

Daniel A. Schiffman*

*Department of Economics and Business Administration, College of Judea and Samaria, Ariel, Israel 44837. I thank Francois Velde for allowing me to reproduce material from his website, and for providing me with useful background information on medieval minting. I also thank Ephraim Kleiman, Dov Paris, Warren Young, Jacob Rosenberg and participants at the History of Economics Society meetings (2002) for comments and suggestions on earlier drafts.
I. INTRODUCTION

The corpus of Jewish legal writings contains many discussions of economic issues and ideas. Yet, aside from a small group of scholars, historians of economics have tended to ignore the texts of Jewish law. As Ephraim Kleiman (1997) points out, the sheer size and inaccessibility of the Jewish law corpus presents a major barrier. Economic ideas are scattered across a vast amount of material. The canonical text of Jewish law is the Talmud, which spans 2,700 folio pages and two million words. Hundreds of commentaries have been written on the Talmud (or parts of it). There are three major codes of Jewish Law (based on the Talmud and selected commentaries), plus commentaries on the codes and lesser known codes (based on the major codes). About one million responsa (questions and answers in Jewish law) are known to exist; these are collected in hundreds of books.¹ Today, new commentaries and responsa appear each year, in addition to multiple rabbinic journals. In order to understand these materials, the scholar must be well versed in Hebrew, Aramaic, and the reading of the Talmud.

A number of articles have been written on Talmudic economics, from a history of economic thought perspective (see especially Kleiman 1973, 1987a, 1987b and Liebermann 1979).² However, little research has been done on the post-Talmudic medieval period (Kleiman 1997). This paper addresses the valuation of coins and related monetary ideas, in the writings of medieval Jewish jurists. It presents their approach to various monetary problems, and compares it to the approach of their Christian contemporaries.
From an historical perspective, the monetary ideas of Jewish jurists would seem to be of limited relevance. Two factors limited the practical applicability of their ideas. First, Jews were subjects, not rulers, and were rarely in a position to make policy. Jewish jurists recognized the law of the land as binding, and accepted established business customs, unless they contradicted Jewish law. Second, Jews were excluded from most occupations in medieval Europe. They made their living by lending money at interest, to both Jews and non-Jews (Nelson 1969, Shatzmiller 1990). This reality created a serious problem for Jewish jurists. On the one hand, the Bible prohibits charging interest to a fellow Israelite. On the other hand, enforcing this prohibition would cost Jewish moneylenders a lot of business. To solve the problem, Jewish jurists allowed the use of non-Jews as middlemen, in order to circumvent the prohibition (Soloveitchik 1985). Yet many of the Talmudic dicta that relate to money assume that interest is prohibited. Medieval commentators and codifiers maintained this assumption, despite the fact that it rarely applied in practice.

Despite their limited applicability, the texts to be studied here reveal a great deal about the medieval Jewish conception of money, and how it differed from that of contemporary non-Jewish jurists. The Romanists (jurists of Roman Law, upon which European common law was based) were wedded to the doctrine of intrinsic worth; to them, a coin was worth as much as the precious metal inside it and no more. Coins were supposed to circulate by weight, with exchange rates between coins fixed according to the ratio of precious metal content. (Canonists, or church lawyers, held a somewhat less rigid view). Jewish commentators and codifiers, on the other hand, recognized and accepted deviations from intrinsic worth; since they regarded the Talmud as their
canonical text, they followed its lead in deviating from intrinsic worth. Not only that, they broadened the scope of these deviations through exegesis and codification. Medieval Jewish jurists were fully aware of regimes in which money circulates by tale (count), and were willing to accommodate these regimes. However, they did not formulate a comprehensive theory that would provide the basis for circulation by tale.

II. CONCEPTIONS OF MONEY IN THE MEDIEVAL CHRISTIAN WORLD

Thomas Sargent and Francois Velde (2002) explore “The Big Problem of Small Change.” Beginning in the 13th century, the monetary systems of Western Europe struggled with shortages of small denomination coins. The problem persisted until the 19th century, when a “standard formula” for handling small denominations was discovered. Sargent and Velde pose two major questions: (a) Why did systems of commodity money with multiple denominations give rise to a problem of small change? (b) Why did it take so long to arrive at a solution?

The first question is quite technical, and Sargent and Velde address it by means of a formal model. The second question receives an historical treatment. The basic story runs as follows: Two major hurdles had to be overcome before the standard formula could be implemented. First, medieval minting technology could not produce large quantities of difficult-to-counterfeit token coins, as required by the standard formula. Second, medieval thinkers held, almost without exception, that coins should be valued by weight (“intrinsic worth”). Token coinage (which is almost intrinsically worthless) was completely unacceptable to medieval thinkers.

How did medieval thinkers come to believe in intrinsic worth? We cannot give a complete answer, but we do know the following: Although Roman Law does not dictate
valuation by intrinsic worth, the Romanists assumed it, and reinterpreted the Roman Law texts accordingly. According to the Corpus of Justinian, a loan of coins is subject to the law of *mutuum*. The category of *mutuum* comprises all consumable commodities that are weighed, measured or counted. One who borrows such objects is legally required to return objects of the same kind and quality. The Corpus does not specify whether coins are to be weighed, measured, or counted. The Romanists assumed that coins were to be weighed and measured, not counted. Based on this assumption, they ruled that one who borrowed coins must repay in metal of the same weight and fineness. For example, if the original coins were subsequently debased, the debtor could not repay in new, debased coins. This rule was formalized around 1220 in Portius Azo’s *brocard* (general principle), which states that “the same money or measure is owed that existed at the time of the contract.” The coin-as-commodity doctrine became known as the *communis opinio*, a name which reflected its wide acceptance.

Until 1200, the monetary system of Europe was simple—it was based almost exclusively on Charlemagne’s silver penny, which was first introduced in 800. In this environment, the Romanists used the coin-as-commodity doctrine to successfully resolve most legal issues that arose in economic life. But after 1200, the Romanists faced a far more complex reality. The monetary systems of different political domains evolved and diverged from each other. Coins issued by various principalities came to circulate side by side; coins were now issued in different denominations, were made of different metals (gold, silver, copper and alloys), and were made according to multiple purity standards. All of these parameters changed over time.

The new monetary environment was closer to that which existed in Greco-Roman
times. It forced the Romanists to deviate from intrinsic worth, by allowing for various exceptions and qualifications. The acceptance of exceptions and qualifications made it easier for thinkers to contemplate more far-reaching deviations. At the same time, the Canonists studied the issue of coin valuation from a different perspective. They asked whether the monarch had the right to levy seigniorage on the minting of coins (which is clearly a deviation from intrinsic worth). They concluded that seigniorage was acceptable and in some cases even desirable. Ultimately, the intellectual process just described led to the entirely new monetary doctrines that would emerge during the Renaissance.

Due to their adherence to the doctrine of intrinsic worth, the Romanists faced difficulties in reading older sources that seemed to articulate dissenting viewpoints. They were forced to radically reinterpret texts such as this one, written by the Roman jurist Paulus (d. 235):\textsuperscript{12}

All buying and selling has its origin in exchange or barter. For in times past money was not so, nor was one thing called “merchandise” and the other “price”; rather did every man barter what was useless to him for that which was useful, according to the exigencies of his current needs; for it often happens that what one man has in plenty another lacks. But since it did not always and easily happen that when you had something which I wanted, I, for my part, had something that you were willing to accept, a material was selected which, being given a stable value (\textit{aestimatio}) by the state, avoided the problems of barter by providing an equality of quantity
That material, struck with a public design (*forma*), offers use (*usu*) and ownership (*dominium*) not so much by its substance (*ex substantia*) as by its quantity (*ex quantitate*), so that no longer are the things exchanged both called wares but one of them is termed the price (*pretium*).

As Sargent and Velde (p. 94) point out, the Romanist glossators were especially troubled by the phrase “not so much by its substance as by its quantity” and were forced to twist its meaning in order to fit their preconceptions. As modern economists, we recognize here an early statement of what is known as the “double coincidence of wants” problem. But the dichotomy between “wares” and “price” is not so easily understood. What are its practical ramifications? The Talmud, which was influenced by experience with the Greek, Roman, and Persian Empires, espouses a view of money that is very close to that of Paulus. Its discussion sheds much light on the meaning and significance of the wares/price dichotomy.

### III. The Intellectual World of Jewish Jurists

Jewish jurists dealt with the same issues as their non-Jewish counterparts, but from a different frame of reference. They accepted the Babylonian Talmud, which was compiled circa 500, as their authoritative legal text. By convention, they were not allowed to dispute an unequivocal Talmudic ruling. Their function was to interpret the Talmud, choose between conflicting Talmudic views, and use its precedents to deal with new situations as they arose. On the surface, it would seem that they were prevented
from expounding a monetary doctrine of their own. Nevertheless, commentators and
codifiers did view the Talmudic texts through the prism of their own social and economic
experiences. Often they came up with new insights, which quite possibly differ from the
intention of the Talmud itself. By expanding or limiting the applicability of Talmudic
dicta, they shaped the legal rulings that guided their communities in practice. We shall
see that their use of interpretive license and creativity reveals much about their thought
on money and its valuation.

Essentially, all discussions among medieval Jewish jurists began with the
Babylonian Talmud. The Talmud grappled with many of the same monetary issues that
arose in the Middle Ages: repayment of loans following debasements or demonetizations,
the legal status of clipped or otherwise deficient coins, and questions of interest and
usury. While Talmudic monetary doctrine is not always stated explicitly, it can be
inferred from various laws that pertain to coins and monetary transactions (Liebermann
1979). The Talmud did not advocate a pure commodity view of money. It allowed for
regimes in which certain coins circulated by tale, rather than by weight. While attaching
great importance to governmental fiat, it did not advocate a pure fiat money regime
either. Rather, the Talmud attempted to adapt itself to the contemporary psychology of
market participants, which can best be described as “circulation by weight, but not in
every circumstance.”

IV. DEFINING MONEY: “COIN” VS. “PRODUCE”

Much of the Talmud’s discussion of money is found in Tractate Bava Metzia,
Chapter Four. Although this passage has been treated in previous work (Kleiman 1973,
Lieberman 1979), we revisit it here (with a different emphasis) because it is essential background for our analysis.

The Mishna (Bava Metzia 4:1) discusses the legal acquisition of coins, within the general context of laws of acquisition. As a general rule, when a commodity is purchased, the mere payment of money does not finalize the sale. This means that either party may subsequently choose to renege on the deal. Only a symbolic act involving the object (in the case of a movable object, lifting or pulling towards oneself) effects a final sale, which is legally binding on both parties.\(^{15}\) The (unstated) question to be addressed is: If two people exchange coins of two different types, which coin is considered “coin” (i.e. money par excellence), meaning that that its transfer to the other party does not finalize the sale, and which coin is considered “produce” (a commodity), so that its transfer to the other party does finalize the sale?

The Mishna answers (my translation follows the classic commentary of Rashi, an eleventh century French rabbi\(^{16}\)):

Why does the Mishna grant silver coins a special status, relative to gold or copper? The commentators say that silver coins were the most liquid at the time. Thus, whichever coin performs best as a medium of exchange is considered “coin,” and all others are considered “produce.” This notion is reflected in the following anecdote, which is related by the Talmud (Bava Metzia 44a):

Rabbi [honorific for Rabbi Judah the Patriarch, editor and compiler of the Mishna—DS] taught “gold acquires silver” to his son Rabbi Simeon.

Rabbi Simeon said to him, “Rabbi, in your youth you taught us that ‘silver acquires gold’ and now you teach in your old age, ‘gold acquires silver’?”

Rabbi Judah’s answer to his son’s objection is not recorded. The Talmud explains that Rabbi Judah changed his views because the reality changed. When he was young, he saw gold coin as the preeminent medium of exchange; later on, he came to see silver coin as preeminent. Rabbi Simeon refused to accept his father’s change of opinion. The Talmud offers no specific reasons for the opinions of Rabbi Judah (earlier and later) and his son Rabbi Simeon.

Daniel Sperber (1991) analyzes this passage and related texts in light of historical evidence. He explains that Rabbi Judah changed his opinion circa 195, in response to a “tremendous boom in the circulation of denarii” that began in 193 under Emperor Septimius Severus. This had an immediate inflationary impact. The public lacked confidence in the silver coinage minted in Rome, and therefore Rabbi Simeon refused to accept his father’s view and continued to adhere to a gold standard. The rabbis of the
third century concurred with Rabbi Simeon, and taught that “silver acquires gold, but
gold does not acquire silver.” Sperber concludes that the rabbis were not fooled by the
government’s actions. While officially the monetary system operated on a silver
standard, a gold standard existed de facto, and so the Talmud based its rulings on a gold
standard. Subsequently, the rabbis were proven correct. Around 301, Emperor
Diocletian switched to a gold standard as part of a broad-based monetary reform.

In subsequent passages, the Talmud defines as “produce” (commodity) any coin
that is unstable, continually debased, or not accepted widely by the public. If more than
one coin is stable in value, then the most commonly accepted coin is considered “coin”
par excellence, and the other coin is regarded as (relative) “produce.” What are the
ramifications of “coin” status, as opposed to “produce” status? The Talmud (Bava
Metzia 44b) relates an incident in which Rav borrowed gold dinarii from the daughter of
Rabbi Hyya, and the gold dinar appreciated in value. Rav approached Rabbi Hyya to
ask him what to do. If gold were a commodity, then repaying in appreciated gold coins
would constitute interest, which is prohibited. Rabbi Hyya replied, “Go pay her good
and heavy [coins].” The Talmud explains this incident by assuming that Rabbi Hyya
considered gold to be “coin.” By definition, it could not fluctuate in value; all
variations in its purchasing power were to be attributed to conditions in goods markets.

The notion of “coin” directly contradicts the pure commodity view of money. To
the Talmudic mind, the coin type that best fulfills the functions of money assumes a
special non-commodity legal status. The best coin is defined with respect to the
transaction in question, so that silver coins can be “produce” relative to gold, and at the
same time assume “coin” status when compared with copper.
Continuing its discussion, the Talmud (Bava Metzia 44b) cites a Mishna clause from another tractate (Eduyot 4:7), which defines the relationships between various coins and gives an exchange rate of 24 copper issar per silver dinar. Why is this information necessary, asks the Talmud? It answers that the information is needed for “buying and selling.” Rashi explains that charging someone more than 24 issar for a dinar constitutes cheating.

The Tosafists, (a large group of 12th –13th century French rabbis, whose collective work is known as Tosafot, or “additions”) reject Rashi’s explanation. Since the Talmud (elsewhere) recognizes that exchange rates fluctuate, why would it attempt to dictate a fixed rate of 24 issar per dinar? Rather, say the Tosafists, the Talmud is giving a rule of thumb for dealing with exchange rate fluctuations. Suppose that a buyer agrees to pay 24 copper issar for a good, and the exchange rate subsequently changes from 24 issar per silver dinar to 32. Then he must pay 32 issar (or a silver dinar). In this case, copper is “produce” and silver is “coin.” Thus, the buyer cannot claim that the exchange rate change is due to silver’s depreciation; this is ruled out a priori by silver’s “coin” status. The Tosafist view is hard to fit into the terse Talmud text; Rashi’s view appears to be more faithful to the text. Yet the logic of the Tosafists is powerful.

What is innovative in this Tosafist principle? The Talmud had stated explicitly that if a loan is made in “coin,” and exchange rates change while the debt is outstanding, no adjustment should be made. On the other hand, if the loan were made in “produce,” an adjustment must be made for any exchange rate change. The Tosafists broaden this principle to all purchases and sales. When the buyer agrees to pay in “coin,” no adjustment is made for subsequent exchange rate changes. The treatment of this case
accords with the doctrine of intrinsic worth. As long as the precious metal content is unaltered, the coin’s value is unchanged in the eyes of the Talmud, despite exchange rate movements. But when the buyer agrees to pay in “produce,” adjustment must be made for exchange rate movements, despite the fact that the precious metal content remains the same as before. In other words, the doctrine of intrinsic worth is not applied to “produce.” The Tosafists broaden this deviation from intrinsic worth, so that it applies not only to loans but also to purchases and sales.

IV. WORN-DOWN COINS

In Jewish Law, ordinary sales of goods are subject to the prohibition of ona’ah. Ona’ah occurs when one of the parties to the sale takes advantage of the other’s lack of information in order to overcharge or underpay, relative to the market price.\(^\text{21}\)\(^\text{22}\)\(^\text{23}\) The Talmud defines three degrees of ona’ah, which differ according to the extent of the deviation from market price: first degree, a deviation of more than “one-sixth” (today, this would be expressed as one-fifth to one-seventh, depending on the case), second degree, a deviation of exactly “one-sixth”, and third degree, a deviation of less than “one-sixth.” The major codifiers (Rabbis Moses Maimonides, Jacob ben Asher and Joseph Caro) rule that first-degree ona’ah makes the sale automatically null and void. In a case of second-degree ona’ah, the sale remains valid, but the amount of the discrepancy must be returned. Third-degree ona’ah is prohibited ab initio, but if it occurs there are no legal consequences.\(^\text{24}\)

The Mishna (Bava Metzia 4:4) records a dispute among the rabbis: “How much may a sela [coin] be missing, without reaching the point of [second-degree] ona’ah?”
Three opinions are cited: “1/24,” “1/12,” and “1/6” (in either direction). The codifiers choose to follow the last (“1/6”) view.

Tosafot (Bava Metzia 51b) is troubled by a statement of Rava (Talmud Bava Metzia 56b) that seems to contradict the Mishna just quoted. Rava says, “Anything that is [sold] by measure, count or weight, even [if the degree of cheating is] less than the amount of ona’ah, the sale is rescinded.” In other words, the law is stricter when the seller cheats the buyer on quantity. Regular ona’ah parameters apply only to a case of asymmetric information regarding the value of an item. The Tosafists ask: Is a coin not something that is traded by weight? How can Rava maintain his view in the face of this Mishna? They answer: “Here we are speaking of a case where he transferred it as coin [in a statutory sense], and not as weight.” Tosafot does not elaborate further. Presumably, Tosafot is saying that the parties may opt to trade coins by tale (“as coin”), not by weight (as long as the coins are not missing 1/6 or more of their official metallic content). This is consistent with a later Talmud passage (Bava Metzia 52a), which explicitly allows passing at full value a coin which is missing less than the ona’ah threshold. Obviously, the Tosafist view directly contradicts that of the Romanists.

Apparently, Maimonides (1135-1204, Spain and Egypt) was bothered by the same question as the Tosafists. In his code Mishne Torah (completed 1177), he writes (Laws of Sales 12:10): “…If the sola was missing one-sixth, and they were expending the selaim [plural of sola] by tale and not by weight, he [who passes such a coin] must return the amount of the ona’ah.” Here, Maimonides does not issue an explicit ruling for a situation in which coins trade by weight. But elsewhere, he writes: “One who sells to his fellow by measure, weight or count, and [the seller] made a mistake [even] of the
smallest amount, [the discrepancy] must be returned…” (Laws of Sales 15:1). This formulation is identical to Rava’s statement (Talmud Bava Metzia 56b). One of the commentators on Maimonides’s code infers that Maimonides intended the latter passage (Laws of Sales 15:1) to apply not just to goods, but also to coins that trade by weight. Thus, where coins trade by weight, even the slightest deviation from the official weight must be returned. If coins trade by tale, a deviation of up to one-sixth is allowed. We may conclude that Maimonides explicitly recognized that coins may trade by tale, and prescribed one rule for that situation and another rule for a situation where coins are traded by weight.

What did medieval Jewish jurists say about accepting coins that were not full-weight? The Mishna (Bava Metzia 4:4) says: “He may give [a deficient sela] to second tithe\textsuperscript{28}, without being concerned that it is inadequate, because [one who refuses to accept it] is only a bad soul.” The Talmud (Bava Metzia 52b) remarks that this applies only to a coin which would be accepted by others; if others would refuse to accept the coin, it is ruled unsuitable for second tithe.

Tosafot asks: How much is the coin missing, and what do we mean exactly by refusal to accept? Tosafot offers three possible interpretations: (a) The coin is missing the fraction that constitutes \textit{ona’ah} (say one-sixth). When it is given for second tithe, it is evaluated by actual weight. The contributor need not be concerned that the coin might have the status of bullion (bullion may not be used for second tithe). The coin is not considered bullion, because anyone who refuses to accept it (by weight) as depreciated coin, and insists on valuing it as bullion (at a value lower than that of depreciated coin), is a miserly person who deserves to be condemned. (b) According to Rabbi Isaac ben Meir,
the coin is missing less than the fraction of \textit{ona’ah}. Anyone who refuses to accept it at full value is called a miser; therefore, it is assigned full value when used for second tithe.

(c) Rabbi Judah ben Nathan (son-in-law of Rashi) contends that the coin is missing the (exact) fraction of \textit{ona’ah}. Nevertheless, it may be given to second tithe at full value, since only a miser would refuse to accept it at full value.

Before analyzing interpretations (a) and (b), we should note that interpretation (c) is quite problematic. Rabbi Judah ben Nathan seems to be saying that one must accept second degree \textit{ona’ah} without restitution, or be condemned as a miser for refusing to do so. Why would the rabbis condemn someone for insisting on his legal rights? Because of this difficulty, the editor of our Tosafot passage rejects interpretation (c).

According to interpretation (a), the “bad soul” is a person who refuses to recognize the seigniorage component in the value of a coin. Many Romanists held exactly this view. Based on Accursius’ gloss to Digest 18.1.1, they held that a coin should be worth as much coined as uncoined, and that seignorage should be zero (Sargent and Velde, 95). (However, Canonists accepted the collection of seigniorage). The Talmud flatly rejects the pure metalist, anti-seigniorage view. This is clear from a previous discussion (Bava Metzia 45b). Suppose A wishes to acquire an object (or a plot of land) from B. The parties may finalize the transaction by means of a procedure known as \textit{chalifin}. To perform \textit{chalifin}, A gives B some movable object (other than the object being transferred; the classic example is a handkerchief) and B lifts it. May \textit{chalifin} be performed using coins? Two rabbis, Rav and Levi, dispute this issue (the Talmud does not know who holds which opinion). Why does one rabbi disallow coins? Rav Pappa explains that a specific and whole item is required. Coins fail to meet this
criterion, since the government may demonetize them at will and thus reduce their value. Maimonides codifies Rav Pappa’s explanation; he disallows the use of coins in *chalifin*, while permitting the use of bullion, demonetized coins, or foreign coins that are not accepted in local trade (even if they are convertible to domestic currency).  

Interpretation (b) may be understood in light of the Tosafot (Bava Metzia 51b) and Maimonides passages (Laws of Sales 12:10, 15:1) discussed above. If coins circulate by tale, then anyone who insists on a full-bodied coin, refusing to forgive a deficiency of less than one-sixth, deserves condemnation. In other words, a regime of intrinsic worth is not seen as normative ab initio. If such a regime prevails, then Jewish law will recognize it and allow people to insist on full-weight coins. But where coins trade by tale, Jewish law recognizes that regime and condemns anyone who rejects less than full-weight coins (as long as the coin is missing less than one-sixth).

V. REPAYMENT OF LOANS FOLLOWING REINFORCEMENTS OR DEBASEMENTS

The Talmudic sages paid special attention to the problem of repaying a loan following a reinforcement. They were concerned that payment in new, heavier coins would constitute an inadvertent, ex post payment of interest.  

In Bava Kamma 97b-98a, the Talmud relates a dialogue which took place in the fourth century. Since the language is cryptic at times, I translate according to Rashi’s interpretation:

Rava asked Rav Chisda, “One who lends to another upon a specific coin, and the government added to its value, what is the law?” Rav Chisda
answered, “The debtor pays the creditor in the coin in circulation at the
time of payment.” Rava said, “Even if the new coin is as large as a
sieve?” “Yes.” “Even if the new coin weighs a quarter of a kav?” “Yes.”
“But produce then becomes cheaper relative to the new coin, so that the
creditor gains from the reinforcement, and is effectively receiving
interest.”

Rav Ashi said, “We must see why produce prices have declined. If the
decline in produce prices was caused by the reinforcement of the coin, we
go and deduct from the debt accordingly; but if it was caused by rainfall,
which raised crop yields, we do not deduct from the debt. [The
anonymous editorial voice asked:] But with respect to bullion, the creditor
has gained! If he melts the new coins down to make scrap metal, he will
receive more metal than the original coins would have yielded, which
constitutes interest! Rather, let us follow the precedent established by Rav
Pappa and Rav Huna son of Rav Joshua, in the story that follows.

A man made a loan to his fellow upon a specific coin, and the government
added to the metal content of that coin. Rav Pappa and Rav Huna son of
Rav Joshua went to Agardemis, an Arab merchant, who had both types
of coins in his possession. They examined the coins and found that eight
new coins contained the same amount of metal as ten new coins. They
ruled that the debtor should repay the debt in new coins, with eight new
coins valued as equal to ten old coins. Through this decision, they established a legal principle: If the new coin contains at least 125% of the metal that the old coin contained, the debtor pays a reduced amount of new coin. Otherwise, the debtor must pay in new coin exactly the number of coins he borrowed, with no adjustment being made.\(^{32}\)

Before beginning to analyze the passage, we should note that the Talmud’s discussion relates to a case where the parties specified a particular coin. The commentators agree that if the parties made a pure commodity loan (in a manner that is permissible according to Jewish law\(^{33}\)), fluctuations in the money value of the commodity are of no concern. If 100 apples were borrowed, 100 apples must be paid back.\(^{34}\)

The passage poses an obvious question: Why does the Talmud choose 25% as the threshold? Why not adjust debts when the reinforcement is less than 25%? Two major approaches appear in the medieval commentators; we will call them the “25% melting cost” and “non-zero variance” views.

The “25% melting cost” view is associated with Rabbi Asher ben Yehiel (1250-1329, Germany and Spain, known as Rosh).\(^{35}\) According to Rosh, when coin is melted down, exactly 25% of the original metal is lost to the melting process and the payment to the craftsman. Thus, the creditor can gain from melting down the new, heavier coin if and only if the reinforcement exceeds 25%.\(^{36}\) Rabbi Jonathan of Lunel (Provence, France, ca. 1150-ca. 1215; a correspondent of Maimonides) concurs with Rosh.

Rabbi Avraham Halevi (Egypt, 1650-1712), in his work Ginat Veradim (“Garden of Roses”)\(^{37}\), objects to the “25% melting cost” view; it is simply not true that 25% of the
metal is lost in the melting process and payment to the craftsman. He reports that minting costs are at most 5% for gold coins and 10% for silver coins (the latter are impure, containing copper base metal, and they are made into small pieces, which requires a lot of work). Francois Velde confirms that 25% is much too high; in the Middle Ages (when the same technology prevailed as in the Talmudic period), the loss of metal from melting amounted to 0.5%, and assaying costs were 1-1.5% at most. Casters were paid just 0.04% in medieval Venice (private communication). Rabbi Halevi speculates that the Talmudic rabbis lived very far from the mint. Therefore, they assumed that the creditor would incur significant transportation costs, in addition to the cost of minting. In order to allow the creditor to recoup these costs, the Rabbis set the threshold at 25%. While this notion is not completely implausible, it is difficult to accept. Why would the rabbis fix a single, arbitrary figure to represent travel costs?

The “non-zero variance” view is advocated by Rabbi Solomon ben Avraham Adret (Spain, 13th century, known as Rashba). In reality, the actual weight of a given coin varies. As long as the reinforcement is below 25%, it is possible that the new, “heavier” coin is in fact equivalent in weight to the old, “lighter,” coin. In such a case, there is no certainty that the debtor would take a loss, measured in terms of bullion, if the debt were paid in new coin, without any adjustment. The rabbis presumed that the parties would automatically forgive an uncertain, ex post transfer of wealth. Rashba cites Rabbi Avraham ben David (Provence, France, 12th century, known as Ra’avad) as the source for the “non-zero variance” view. It is interesting to note that Ra’avad, in his novellae on tractate Bava Kamma (“Chiddushei HaRa’avad al Masechet Bava Kamma”), mentions both views, but does not express a preference for one or the other.
The “non-zero variance” view can be formalized in modern probabilistic terms: There is a nonzero probability that the new coin is equivalent to the old coin, as long as the weights of both coins have a nonzero variance. Suppose that the light coin (L) has a mean weight of \( \mu \), and the heavy coin (H) has a mean weight of 1.25\( \mu \). Let the weights of both coins be independently normally distributed with an unknown (and identical) variance \( \sigma^2 \). Then the difference in weight, \( L - H \), is normally distributed with mean – 0.25\( \mu \) and variance 2\( \sigma^2 \). Equivalently, \( Z = (L - H +0.25\mu)/2\sigma^2 \) has a standard normal distribution and \( \Pr (L > H)= 1 - \Phi(0.25\mu/2\sigma^2) \). As long as \( \sigma^2 > 0 \), \( \Pr (L > H) > 0 \). As \( \sigma^2 \) goes to infinity, \( \Pr (L > H) \) converges to one-half. This convergence occurs regardless of the actual mean of \( H - L \); the number 0.25 is not crucial.

Rabbi Halevi criticizes this view as well; he rejects the assumption that some coins weigh 25% above average, on the grounds that this number is implausibly high. A coin that heavy could not be expected to circulate; if it were used in a transaction, it would immediately be detected by market participants, without the use of a device to formally weigh it. Rabbi Nachum Yabrov (1988) accepts Rabbi Halevi’s objection. Is it plausible that the heaviest coins would weigh 50% more than the lightest? Therefore, Rabbi Yabrov interprets Rashba differently, in order to neutralize Rabbi Halevi’s objection. Rabbi Yabrov suggests that 25% should instead be taken as the spread between the heaviest and lightest coins. Now suppose that, following a reinforcement, the average new coin weighs 25% more than the average old coin. Also suppose that the old coin that was actually lent was 12.5% heavier than average (the maximum possible weight), and that the new coin used for repayment weighed 12.5% less than the average new coin. Then the heaviest old coin and the lightest new coin have equal weights.
People know that the coins may actually have equal weights, so there may be no problem of interest. Therefore, repaying in new coins does not give “the appearance of interest” and is permissible.

If we work out an example, we see that in actuality, the heaviest old coin is slightly heavier than the lightest new coin. Let the old coin have a mean weight of 1, with a minimum weight of 0.875 and a maximum weight of 1.125. Then the new coin will have a mean weight of 1.25, with a minimum weight of 1.09375 (1.25 minus 12.5%) and a maximum weight of 1.40625 (1.25 plus 12.5%). Although 1.09375 does not equal 1.125, Rabbi Yabrov’s logic does hold; there is no certainty that repayment in new coins will entail interest.

Does the 25% rule fulfill its purpose, as articulated by proponents of the “non-zero variance” explanation? Does it really ensure that the old, “lighter” coin is in fact lighter than the new, “heavier” coin? Which version of it performs best, the “standard” (± 25%) version or Rabbi Yabrov’s (± 12.5%) version? In order to test the efficacy of the 25% rule, we need some measure of variance. Richard Duncan-Jones (1994) reports summary statistics on the weight and fineness of coin hoards from the Roman period. Although these data predate the fourth century, they should provide a reasonable approximation of fourth century conditions (since the minting technology did not change). Using the statistics for silver *denarii*, we can compute the probability that the “lighter” coin L would actually be heavier than the “heavier” coin H, where H – L equals 0.25*target weight. We are concerned with the anticipated consequences of a 25% (or 12.5%) reinforcement; actual changes in target weight are only of secondary interest.41
<table>
<thead>
<tr>
<th>Emperor</th>
<th>Silver Denarius Target Weight (grams)</th>
<th>Percentage Coefficient of Variation, Actual Weight = 100 × (s / \bar{x})</th>
<th>Variance of Actual Weight (s²)</th>
<th>Pr (L &gt; H) = 1 - \Phi(0.25\bar{x}/2s²) (“Standard” understanding of Ra’avad &amp; Rashba)</th>
<th>Pr (L &gt; H) = 1 - \Phi(0.125\bar{x}/2s²) (Rabbi Yabrov’s understanding of Ra’avad &amp; Rashba)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augustus</td>
<td>3.80</td>
<td>4.3%</td>
<td>0.0267</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Tiberius</td>
<td>3.75</td>
<td>2.8%</td>
<td>0.0110</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Claudius</td>
<td>3.75</td>
<td>4.4%</td>
<td>0.0272</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Nero 54-64</td>
<td>3.63</td>
<td>3.3%</td>
<td>0.0143</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Nero 64-68</td>
<td>3.36</td>
<td>2.8%</td>
<td>0.0089</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Vespasian</td>
<td>3.36</td>
<td>4.3%</td>
<td>0.0209</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Titus</td>
<td>3.47</td>
<td>2.8%</td>
<td>0.0094</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Domitian 82-85</td>
<td>3.51</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Domitian 85-96</td>
<td>3.51</td>
<td>6.0%</td>
<td>0.0444</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Nerva</td>
<td>3.47</td>
<td>5.5%</td>
<td>0.0364</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Trajan</td>
<td>3.36</td>
<td>5.3%</td>
<td>0.0317</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Hadrian</td>
<td>3.36</td>
<td>5.3%</td>
<td>0.0317</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Antoninus Pius</td>
<td>3.36</td>
<td>6.5%</td>
<td>0.0477</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Marcus Aurelius</td>
<td>3.36</td>
<td>5.6%</td>
<td>0.0354</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Commodus 180-186</td>
<td>3.16</td>
<td>10.3%</td>
<td>0.1059</td>
<td>0.0001</td>
<td>0.0311</td>
</tr>
<tr>
<td>Commodus 187-192</td>
<td>2.83</td>
<td>15.5%</td>
<td>0.1924</td>
<td>0.0330</td>
<td>0.1790</td>
</tr>
<tr>
<td>Septimius Severus 193-198</td>
<td>3.16</td>
<td>11.3%</td>
<td>0.1275</td>
<td>0.0010</td>
<td>0.0607</td>
</tr>
<tr>
<td>Septimius Severus 198-211</td>
<td>3.36</td>
<td>7.8%</td>
<td>0.0687</td>
<td>0.0000</td>
<td>0.0011</td>
</tr>
<tr>
<td>Caracella</td>
<td>3.23</td>
<td>7.7%</td>
<td>0.0619</td>
<td>0.0000</td>
<td>0.0006</td>
</tr>
<tr>
<td>Elgabalaus</td>
<td>3.05</td>
<td>13.7%</td>
<td>0.1746</td>
<td>0.0145</td>
<td>0.1375</td>
</tr>
<tr>
<td>Severus Alexander</td>
<td>3.10</td>
<td>10.0%</td>
<td>0.0961</td>
<td>0.0000</td>
<td>0.0219</td>
</tr>
</tbody>
</table>
The rule of thumb given in the Talmud would have worked well under all the regimes, if it is understood according to the “standard” interpretation of Rashba. If it is understood according to Rabbi Yabrov’s interpretation of Rashba, it would have worked well (if “well” is defined as Pr \(L < H\) < 10%) under 18 of the 20 emperors.

In codifying the law for our case, Maimonides writes the following (Laws of Borrower and Lender 4:11):

If one lends to his fellow upon a particular coin, or if a man wrote into his wife’s marriage contract an obligation [on his part] on the basis of a known coin, specifying its weight, and they [the authorities] added to that coin’s weight, if produce became less expensive due to the reinforcement, he deducts the percentage of the reinforcement, even if the reinforcement was minuscule. If produce did not became less expensive due to the reinforcement, he [the debtor] does not deduct but rather pays in the coin that is currently circulating. When is the aforementioned applicable? [The aforementioned is applicable] if the coin was reinforced by up to one-fifth, for example if the weight was four and is now five,\(^42\) but if they [the authorities] added more than one-fifth he deducts the entire amount of the reinforcement, even if produce did not become less expensive, and this is also the law in a case where one lent upon a coin and they [the authorities] debased it.
In the above passage, Maimonides makes explicit two points that are not stated directly by the Talmud: (a) The law applies only where the lender specified the weight of his coins at the time of the loan; (b) The law treats debasements and reinforcements in the same way. Creditors are to be protected from losses of purchasing power due to debasement of the currency, and also must be compensated for a debasement exceeding 25%, regardless of the behavior of prices. Both points are based on the ruling of Rabbi Isaac Alfasi (North Africa and Spain, 1013-1103; known as Rif). Rif writes on the Talmud passage: “And the law is the same in a place where they transact business in moneys of weight, and [the government] reduced the amount of silver in [the coins] or added [to the amount of silver in the coins]; all [such cases are] one [identical] matter.”

Maimonides differs from Rif in one subtle way. While Rif refers to “moneys of weight” as the accepted legal tender, Maimonides requires the lender to stipulate that his coins should be valued by weight. We have already seen (in the case of worn-down coins) that Maimonides recognizes the existence of valuation by tale. The differences between Maimonides and Rif would lead us to think that the Islamic world shifted from circulation by weight (in Rif’s day) to circulation by tale (in Maimonides’ day). But this hypothesis appears to be contradicted by the facts. According to S.D. Goitein (1967), valuation by weight was standard in the Islamic world during the 11th century.

If valuation is by weight, how can the Talmud speak about a case where produce prices remain stable? Both historical and theoretical answers can be suggested. According to Sperber (1991, 132), this is precisely the story of money and prices in the third century: “…Though the actual currency started depreciating already early in the century, prices did not rise radically until some time around the 270’s.” The theoretical
answer is given by Rabbi Meir Halevi Abulafia (a Spanish contemporary of Maimonides). Sometimes the reinforcement of a coin is a reaction to the metal’s prior loss of purchasing power. In order to preempt a general increase in the price level, the government creates a new, heavier coin that commands the same purchasing power as did the old one.

It is possible to suggest a more general theoretical explanation, based upon a combination of the “non-zero variance” view of Rashba with the view of Maimonides. Coins may circulate by weight or by tale. The regime may differ across localities and time periods. If coins circulate by weight, then reinforcements and debasements will affect the price level. In that case, a lender who stipulated valuation by weight should be compensated for a change in coin weight. If coins circulate by tale, prices will remain constant despite a reinforcement/debasement. If the lender nevertheless insisted on valuation by weight, we adjust for the change in weight only if the change exceeds 25%. In such a case, we know almost certainly that the new “heavy” (“light”) coins are actually heavier (lighter) than the coins that were originally lent. But if the change is less than 25%, the new, heavier (lighter) coins may actually be lighter (heavier) than the coins that were originally lent. We are not certain that an adjustment is appropriate, so we do not enforce the lender’s insistence on valuation by weight.

VI. CONCLUSION

Unlike the Romanists, Jewish jurists of the Middle Ages did not adhere rigidly to the doctrine of intrinsic worth. Their monetary doctrines were based on the Talmud, a book which they revered as the most authoritative source of Jewish Law. The Talmud’s
monetary doctrines had been formulated within a complex and sometimes chaotic environment. The Talmudic sages were faced with many of the same issues that would arise in Europe from the 12th century onward; the solutions they devised allowed for certain deviations from intrinsic worth. In clarifying and explicating the original texts, Jewish jurists sometimes expanded the scope of these deviations. They recognized explicitly the possibility of trading coins by tale, and interpreted the Talmud in that light. However, they did not explore the theoretical implications of a system based on circulation by tale.

During the 16th through 19th centuries, succeeding generations of Jewish jurists would respond to the development of new monetary instruments, while incorporating more sophisticated monetary doctrines into their writings. In the early 1980’s, new challenges emerged as the Israeli economy was racked by high and persistent inflation. For example, rabbis were asked whether the practice of indexing loans to the U.S. dollar (or Consumer Price Index) violated the prohibition against interest. I hope to treat these developments in future work.
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**ROMAN LAW**

*Corpus Iuris Civilis.*


**TALMUD AND JEWISH LAW (ENGLISH)**


New York: Artscroll/Mesorah Publications.


**TALMUD AND JEWISH LAW (HEBREW)**


Included in the Responsa Project CD-ROM database, published by Bar Ilan University.


Bar Ilan University has created a computerized database of responsa ("The Responsa Project"). At present, it contains the full text of 372 responsa books.

Other contributors include Barry Gordon, Roman Ohrenstein, Mark Perlman, and Dov Paris.

Some Jews did serve as financial advisors and ministers. The most famous example is Don Isaac Abarbanel (1437-1508), a leading Bible exegete who was finance minister to the kings of Portugal, Spain and Naples.

A famous Talmudic principle states: "The law of the kingdom is the law."

According to Moses Nachmanides, a major commentator on the Bible, there is nothing inherently wrong with charging interest. However, Jews were commanded to bestow kindness on their fellow Jews by making loans interest-free. See Nachmanides’ commentary (1976) on Deuteronomy 23:21.

On the "standard formula," Velde (1998) writes the following: "The method that Cippola (1956) calls the standard formula, consists of choosing a principal (large) denomination, which continues to be provided as before at the initiative of the private sector, this continuing to provide a nominal anchor for the price level. The provision of lower or subsidiary denominations relies on three key elements: 1) monopolization of coinage by the government; 2) issue of token coins; and 3) peg of the token coins by
having the government convert them on demand into the larger denominations. The intrinsic content of token coins was somewhat or much smaller than the face value at which they circulated….the opposite of a token coin is a full-bodied coin.”

7 A technology known as “hammer and pile” was in use from the Greco-Roman period until around 1550. During this long period, there were few changes in its implementation. “Hammer and pile” was finally replaced by mechanized technologies—the screw press and cylinder press after 1550, and the steam press after 1787.

8 This account is based on Sargent and Velde, Chapter 5.

9 The primary text of Roman Law is the Corpus Iuris Civilis, compiled under the direction of the emperor Justinian (527-565). The Corpus consists of three books: the Code (a collection of statutes), the Digest (fragments of scholarly writings), and the Institutions (a text for beginning students).

10 Digest 12.1.3.

11 The text of Azo's brocard can be found in Täuber (1933), pp. 328-330. Täuber cites Azo (1567), p. 136. I thank Francois Velde for providing this reference.

12 Digest 18.1.1.

13 Modern scholars of Jewish intellectual history have demonstrated many examples of this phenomenon. In some instances, commentators acknowledged the influence of their
own reality on their interpretive process. In other instances, the influence of contemporary reality was subconscious.

14 The Babylonian Talmud consists of the Mishna and the Gemara. The Mishna is a condensed work of Jewish law compiled and edited in Palestine by Rabbi Judah the Patriarch, ca. 200. Before that time, Jewish traditions were transmitted orally. The Rabbis whose opinions comprise the Mishna are known as “Tanna(im)” (Tanna is singular, Tannaim is plural); Rabbi Judah the Patriarch was the last Tanna. The Gemara is a commentary on the Mishna by successive generations of Babylonian rabbis, who flourished in the third through sixth centuries. These Rabbis are known as “Amora(im).” The Gemara often speaks in an anonymous voice; this voice expresses questions, answers and analyses that emerged in the course of the editorial process. When scholars say “the Gemara asks” or “the Gemara answers,” they are referring to the anonymous voice.

Throughout the paper, I use the word Talmud (generically) to refer to Babylonian Gemara (and its anonymous voice), and the word Mishna to refer to Mishna.

A second Talmud, the Palestinian Talmud, was compiled ca. 400. Its editorial process was cut short by persecutions; it is therefore briefer and (in many places) more cryptic than its Babylonian counterpart. In general, the Babylonian Talmud is considered more authoritative.

The Tosefta (“supplement”) complements the Mishna; it consists of contemporaneous materials that were not included in the Mishna. Tosefta passages, or variant versions of those passages, are often quoted by both Talmuds.

The Mishna, Talmud and Tosefta are divided into six orders; Tractate Bava Metzia is
located in the order of Nezikin, or Damages. The name Bava Metzia means “Middle Gate,” and it is the second of three lengthy tractates dealing with damages, monetary transactions, contracts and related matters (it follows Bava Kamma, the first gate, and precedes Bava Batra, the last gate.) The Mishna and Tosefta are referenced by tractate, chapter and clause (e.g. Bava Metzia 4:1).

The Babylonian Talmud is referenced by tractate, folio and side (Bava Metzia 44b is the second side of folio 44 in Tractate Bava Metzia). This system of referencing has been in place since the publication of the Venice edition (1520-23). Most volumes of Talmud in use today are reproductions of the Vilnius edition (1880’s), which maintained the pagination of the Venice edition.

Passages of Palestinian Talmud are referenced by means of the Mishna clause which they elucidate (PT Bava Metzia 4:1 elucidates Mishna Bava Metzia 4:1).

Numerous commentaries have been written on the Babylonian Talmud. Some of the major ones will be introduced as they appear in this paper.

A complete English translation of the Talmud was published by Soncino Press, and is available in print or on CD-ROM. The Soncino Edition includes minimal commentary. The Schottenstein Edition and Steinsaltz Edition provide both translation and extensive commentary, but are not yet complete. However, the Schottenstein Edition currently covers all tractates cited in this paper, and is expected to be complete by the end of 2005. The Steinsaltz edition covers several tractates, including Bava Metzia.

While selected tractates of the Palestinian Talmud have been rendered into English, no complete English translation exists. Sperber (1991) includes an English translation and commentary to PT Bava Metzia, Chapter Four.
Rabbi Yohanan gives an interesting reason for this principle (though his colleague Resh Lakish dissents—Bava Metzia 46b). Rabbi Yohanan contends that according to the Pentateuch of Moses, the payment of money finalizes a sale. The Rabbis changed the law in order to deal with an incentive problem that could arise if the Mosaic law were followed. Suppose that a seller accepts money, agreeing to deliver goods (e.g. grain) later, and then a fire breaks out in the seller’s storage facility. If the law would be that payment of money finalizes a sale, the seller would have no incentive to save the goods, as they are legally in the possession of the buyer. To solve this problem, the Rabbis declared that only the buyer’s active possession of an object (lifting or pulling it to himself) effects a final sale.

Rashi (1040-1105) was born in Troyes, France and studied Bible and Talmud with leading rabbis in Mainz and Worms, Germany. Following his studies, he returned to Northern France, where he wrote commentaries on the Bible and Talmud and responded to queries in Jewish Law. The commentaries of Rashi were recognized as classics already in the Middle Ages, and are always studied immediately after the primary text. In all standard editions, Rashi’s commentary appears on the same page as the Talmud text. Therefore, Rashi is referenced in the same manner as the Talmud (tractate, folio and side). The name Rashi is an acronym, derived from the full name Rabbi Shlomo Yitzchaki.

This is implicit in the Babylonian Talmud text, and is explicitly stated in the Palestinian
Talmud version of the story. See PT Bava Metzia 4:1.

18 Since Rabbi Hyya’s actual intent cannot be proven conclusively, the Talmud later suggests an alternative explanation. Nevertheless, this explanation is seen as logically and legally plausible.

19 Rashi’s son-in-law and grandsons were among the major Tosafists. The content of Tosafot passages varies, but there are two types that appear frequently and are therefore worthy of special mention: (a) The Tosafists quote Rashi’s reading of the Talmud, raise logical objections to his reading, and then offer an alternative reading; (b) The Tosafists quote a Talmud text that appears elsewhere, point out an apparent contradiction between that text and the Talmud text currently being studied, and offer one or more possible resolutions. In all standard editions, Tosafot appears (along with Rashi) on the same page as the Talmud text; like the Talmud and Rashi, Tosafot is referenced by tractate, folio and side.

20 The case is not merely hypothetical. Early in the third century, the issar depreciated from 24 per silver dinar to 32. See Sperber (1991, 78), for a translation and discussion of BT Kiddushin 12a.

21 This is how the Talmud interprets the Biblical commandment in Leviticus 25:14. See Weissman (1998) for a detailed theoretical treatment of the law of ona’ah.
The codes give four examples: (a) An object worth six is sold for five; (b) an object worth seven is sold for six; (c) an object worth five is sold for six; (d) an object worth six is sold for seven.

Maimonides (Spain and Egypt, 1135-1204) completed the first major code of Jewish Law, Mishne Torah (“Secondary Torah”), in 1177. It consists of fourteen books and is organized by topic and subtopic. Arba’ah Turim (“Four Columns”), was written by Rabbi Jacob ben Asher (1270-1343, son of Rabbi Asher ben Yehiel; both father and son migrated from Germany to Spain) in the 13th century. His work is often referred to as Tur (“Column”). Rabbi Joseph Karo (1488-1575, Turkey and Palestine) wrote Bet Yosef, a comprehensive commentary on the Tur. He later condensed Bet Yosef to create his own code, Shulchan Aruch (“Set Table”), which is considered the authoritative code of Jewish Law today. Shulchan Aruch follows the same “Four-Column” organization as the Tur. The column that deals with judicial and monetary matters is called Choshen Mishpat (“Breastplate of Justice.”; the name comes from Exodus 28:29).

Maimonides is referenced by subtopic (“Laws of [subtopic]”), chapter and law (e.g. Laws of Sales, 12:10). Tur is referenced by column and chapter (e.g. Choshen Mishpat 117). Shulchan Aruch is referenced by column, chapter and clause (e.g. Choshen Mishpat 117:2). This last subdivision (“clause”) is sometimes omitted; this is the common practice when citing Tur and Shulchan Aruch together.

An English translation of Mishne Torah, Books III-XIV was published by Yale University Press (1949-1972). The material that is relevant to this essay appears in Book XII, the Book of Acquisitions.
For a summary of Shulchan Aruch Choshen Mishpat in English, with commentary, see Quint (1998-2001). Eight volumes have been completed to date, encompassing a substantial portion of Choshen Mishpat.

Market participants understand that appraisals involve some degree of estimation and/or human error, and therefore forgive a discrepancy of up to one-sixth (Rabbi Asher ben Yehiel, 1250-1329, Germany and Spain, known as Rosh; cited in Tur Choshen Mishpat 227 by his son, Rabbi Jacob ben Asher).

Thus, two of the three opinions hold that in cases of possible ona’aa, coins are to be treated differently from goods. The Talmud asks why the three rabbis disagree about coins, while agreeing on a threshold of 1/6 for ona’ah on goods. Abaye (fourth century) answers that some goods, for example clothing, yield extra utility (consumer surplus in modern terms) that money does not. He quotes a popular saying that advises a person to overpay willingly for clothing but not food. The Tosafot note that Abaye’s logic can only explain cases where (a) the buyer overpaid (as opposed to a case where he underpaid the seller) and (b) when the good is an article of clothing. Nevertheless, in order to avoid excessive complexity, the sages of the Talmud did not limit the law of ona’ah to the cases explained by Abaye’s theory.

In the Jewish legal system, post-Mishnaic sages (such as Rava) may not disagree with their predecessors, the sages of the Mishna.
This differs from the law that applies to goods. The seller (buyer) of a good is prohibited from knowingly overcharging (underpaying) by less than “one-sixth.” See Tur and Shulchan Aruch, Choshen Mishpat 227.

Second tithe must be taken from produce during years one, two, four and five of the seven-year sabbatical cycle. It is kept by the owner of the produce, and must be eaten in Jerusalem only. Since it may be difficult to transport the produce itself, the Bible allows for transferring the sanctity of second tithe to money. The money is brought to Jerusalem and spent on food, which is consumed within the city. See Deuteronomy 14:22-27.

Maimonides, Mishne Torah, Laws of Sales 6:1, 6:2 and 6:6.

The Talmud recognizes two major types of interest: direct, “stipulated” interest (ribbit ketzutza), and indirect “dust of interest” (avak ribbit). According to the Talmud, the Bible prohibits direct interest but allows indirect interest. The rabbis took the additional step of prohibiting indirect interest, because they were concerned that people might mistake direct interest for indirect interest, and make loan transactions that violate the biblical prohibition. At the same time, the rabbis maintained a key distinction between direct and indirect interest. They ruled that a borrower who paid direct interest can recover it in court, but a borrower who paid indirect interest has no legal recourse (Maimonides, Mishne Torah, Laws of Creditor and Debtor 4:3, 4:6).

In our case, the problem of interest arises ex post. Since interest is not stipulated in the original loan contract, we are dealing with a case of indirect interest (Rabbi Joseph Karo,
Bet Yosef, commenting on Tur, Yoreh Deah 165). However, some commentators hold that our case is one of direct interest.

31 Rashi renders Agardemis as the name of an “Ishmaelite” (Arab) merchant; the Talmud does indeed use the word “Tay’ah” (Arab) to modify “Agardemis.” However, modern research suggests that Agardemis is a corruption of agorotnomus (αγορωνομος), which means market inspector. (I thank Ephraim Kleiman for making this point.) Elsewhere (Bava Batra 89a), Rashi renders the term “agardemin” as market inspectors. Here, Rashi could have rendered “an Arab market inspector”; it is not clear why he does not.

32 The Talmud itself says only that the two rabbis found the new coin to be equivalent in weight to 125% of the old coin. It is not clear from the text what the actual ruling was in this case; our narrative follows Rashi, as the Tosafists understand his comments. Other commentators, such as Rabbenu Hananel (Tunisia, 11th century, printed on the Talmud page in all Vilnius-based editions), claim that in fact, the debtor ultimately paid one new coin for each old coin. In other words, Rashi claims that the debt must adjusted if the reinforcement comes to at least 25%. Rabbenu Hananel claims that the debt must be readjusted only if the reinforcement exceeds 25%.

33 The Talmudic rabbis were concerned that the price of the commodity would rise, and the debtor would end up paying more (in nominal money terms) than he borrowed. To minimize the likelihood of such an outcome, they required commodity loans to meet certain conditions. These conditions are: (a) A fairly stable market price has been
established for the good, and/or the borrower has similar goods in his possession at the
time of the loan, but lacks access to them for a short time. (b) The lender allows the
borrower to repay as soon as he wishes (according to Maimonides, the lender may not set
a repayment date at all). The laws of commodity loans are detailed in: Mishna Bava
Metzia, Chapter Five and Talmud Bava Metzia 60b-75b; Mishneh Torah, Laws of
Borrower and Lender, Chapter 10; and Tur and Shulchan Aruch, Yoreh Deah 162.

34 If a prohibited commodity loan was made, the law would be different. If prices rose
during the term of the loan, the borrower would repay in kind; if prices fell, the borrower
would repay in money according to the original price.

35 Talmud Commentary of the Rosh, Bava Kamma 97-98.

36 With regard to a case where the reinforcement is exactly 25%, Rosh concurs with
Rabbenu Hananel and disagrees with Rashi. See the previous note.

37 Choshen Mishpat, Principle 4. This work is post-medieval; I cite it because it raises
key issues with respect to the views of the medieval commentators.

38 Chidushei HaRashba (“Novellae of Rashba”), Bava Kamma. An earlier commentator,
Rabbi Eliezer ben Nathan (Mainz, Germany, 12th century, known as Ra’avan), also
advocates this view (Sefer Ra’avanan, p. 192). Later scholars associated the “non-zero
variance” view with Rashba; we follow this convention throughout the paper.
Regarding the minting technology in use until the Renaissance, Sargent and Velde state:

“The process produced imperfect coins of varying size and weight.”

Ra’avad’s most famous work is Hasagot Ha’Ra’avad (“Dissents of Ra’avad”), which is a critique of selected rulings by Maimonides. The Hasagot are printed alongside Maimonides’ code in all standard editions.

Although there were significant changes in *denarii* fineness under the Roman emperors, we will ignore fineness and focus on weight only, in accordance with the Talmud passage under analysis.

Maimonides follows the Talmudic convention in expressing changes as fractions of the final, not initial amount. Thus “one-fifth” in his terminology is equivalent to one-fourth, or 25% in modern terminology.

Ra’avad dissents from the ruling of Rif and Maimonides (Ra’avad, cited in Shita Mekubetzet, Bava Kamma 97-98. Shita Mekubetzet, an anthology of medieval commentaries on the Talmud, was compiled by Rabbi Bezalel Ashkenazi, a 16th century scholar who lived in Egypt. It is a key resource for Talmud scholars, because many of the excerpts copied by Rabbi Ashkenazi did not survive in any other form.) To Ra’avad, Rif and Maimonides are reading something into the Talmud that simply isn’t there. A literal reading of our passage shows that the rabbis had one and only one concern--to prevent the payment of (ex post) interest to the creditor, in the form of increased
purchasing power or potential gains from melting down the new, heavier coin. They do not mention debasement at all; since debasement does not bring gains to the creditor, it does not pose a problem of interest. The Talmud’s silence regarding debasement implies that there should be no adjustment for debasement under any circumstances. Therefore, Ra’avad concludes that debts are adjusted for reinforcement of the currency only, if produce prices decline as a result or if the reinforcement exceeds 25%. Ra’avad seems to have chosen textual literalism over what others saw as obviously logical principles.

Rabbi Baruch of Worms (12th century, Germany), in his work Sefer Hateruma (8:3), finds Ra’avad’s view incredible: How could the Talmud expect the creditor to accept a repayment worth fifty (in real terms) for a loan of a hundred? Rosh, in Responsa of the Rosh (103:1), cites a completely different view in Ra’avad’s name. According to Rosh, Ra’avad maintains that the creditor must always be compensated, even if the debasement was below 25%.

Rabbi Solomon Luria (16th century, Poland and Lithuania), in his Talmud commentary Yam Shel Shlomo, argues that we may set aside Ra’avad’s view (as recorded in Shita Mekubetzet), because we can prove that he himself retracted it. Rabbi Luria’s proof rests on two premises, a factual one and a conjectural one: (a) Ra’avad is silent on the Maimonides ruling that we have just cited (Laws of Borrower and Lender 4:11). That is, he does not record any objection in his critique of Maimonides’ code; (b) it is reasonable to assume that Ra’avad wrote his critique of Maimonides’ code after he wrote his Talmudic novellae. Thus, the critique of Maimonides’ code reflects his later, more developed views.
Maimonides deeply admired Rif’s compilation of the legal material in the Talmud, and rarely deviated from his rulings. Reportedly, he remarked that “one would be hard put to find as many as ten errors” in Rif’s entire work (a work that is massive in scope). Rif’s student, Rabbi Joseph Ibn Migash, was the teacher of Rabbi Maimon, father of Maimonides.

Cited in Shita Mekubetzet, Bava Kamma 97-98.