A MARKET ECONOMY IN THE EARLY ROMAN EMPIRE*

By PETER TEMIN

The economy of the early Roman Empire has been an object of study for at least the last century. The discussion has been marked by continuing debate, known sometimes as the primitivist/modern debate and at other times as the Finley debate, following his famous Sather lectures, *The Ancient Economy*. This paper is a contribution to this debate, written by an economist rather than an ancient historian. My purpose is to define the concept of a 'market economy', and to see if it fits the evidence we have for the early Roman Empire.

Finley declared that, 'ancient society did not have an economic system which was an enormous conglomeration of interdependent markets'.[1] He drew implicitly on research by Polanyi to oppose the views of Rostovtzeff within the field of ancient history and those of Fogel and Engerman in economic history, but he did not explicitly join their conceptual apparatuses.[2] Morris has summarized the debate fuelled by Finley's dramatic lectures in his foreword to the twenty-fifth anniversary edition and argued that the controversy is still vigorous today.[3] I hope to clarify the issues in this debate and even resolve the debate for the period of the early Roman Empire.

I argue here that the economy of the early Roman Empire was primarily a market economy. The parts of this economy located far from each other were not tied together as tightly as markets often are today, but they still functioned as part of a comprehensive Mediterranean market.[4] There are two reasons why this conclusion is important. First, it brings the description of the Roman economy as a whole into accord with the fragmentary evidence we have about individual market transactions. Second, this synthetic view provides a platform on which to investigate further questions about the origins and eventual demise of the Roman economy and about conditions for the formation and preservation of markets in general.

MODELS AND TESTS

Finley called for models of the ancient economy both in his lectures and in his subsequent 'Further Thoughts'.[5] This is a good approach. But what does it mean to use a model of the ancient economy? A model is an abstract representation of reality. It is simpler than reality of necessity because it is created by social and natural scientists who can only conceptualize a few dimensions of reality at a time. Models typically are manipulated in order to reach conclusions, and they have to be simple enough for their formulators to manipulate. With the advent of computers, we can deal with much more complex models than before, but the most useful models often are the simplest.

Most economic models assume the existence of a market economy. The models show how institutions or other economic forces affect prices, quantities, and related variables in one or more industries or, sometimes, in the economy as a whole. The value of the model is two-fold. First, it provides a simplified description of events that can be repeated and discussed. Second, it allows economists to test *counter-factual* propositions.

* I thank Roger Bagnall, Alan Bowman, Richard Eckaus, Joseph Manning, Ian Morris, Steven Ostrow, Walter Scheidel, and the Editor of this journal for helpful comments. All errors are mine alone.

[1] M. I. Finley, *The Ancient Economy* (1973), 22–3.

[2] K. Polanyi, *The Great Transformation* (1944); K. Polanyi, *The Livelihood of Man* (1977); M. Rostovtzeff, *The Social and Economic History of the Roman Empire* (1957); R. W. Fogel and S. L. Engerman, *Time on the Cross* (1974).

[3] I. Morris, 'Foreword', in M. I. Finley, *The Ancient Economy* (updated edn, 1999), ix–xxxvi.

[4] This analysis is similar in spirit to K. Hopkins, 'Taxes and trade in the Roman Empire', *JRS* 70 (1980), 101–25, but concentrates on the processes by which resources were allocated, in contrast to Hopkins' concern with the allocation itself.

[5] Finley, op. cit. (n. 1), 27, 182.

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That is, the economist can ask what would have happened if the institutions or other economic forces had been different than they actually were. The resulting counterfactual history is not an account of events as they happened; it is a conjecture about what would have happened had history been different. The conjecture is conditional on the model. If the model is a poor one, the conjecture will be poor as well. And the conjecture is limited by the model; it can only track the variables in the model in the counterfactual world.

How can we tell whether a model is poor? This is a question that has energized generations of philosophers of science, and I will attempt only the most concrete answer here. A good model fits the observed facts more closely than a poor one. This apparently simple statement has three important components. First, any model depends on the facts behind it. If new data are discovered, models may need to be changed. Stated differently, good models are not made up out of whole cloth; they are distillations of the available data. One advantage of using a model is that it often suggests the need for more data to settle open questions and sets in motion data searches that have proven successful in many fields of economic history. Second, there must be a ranking by which one can tell whether one model fits the facts more closely than another. When there is an abundance of numerical data, modern statistics and econometrics provide tests that economic historians use. When the data are qualitative, as they generally are for the early Roman Empire, less formal tests have to be used. Third, no model is good in the abstract; it is better or worse than an alternative.

This last point is critical. Economics is a comparative science. The story is told of an economist who meets a colleague while walking across campus. The colleague hails the economist and asks, 'How are your children?' The economist responds, 'Compared to what?' This response, only slightly exaggerated in this story, is typical of economists. Economic models are supported by showing that they are superior to another, often called the 'null hypothesis'. The null hypothesis of most economics is that there is a well-functioning market, that prices are determined by supply and demand. This is a problem for the study of the Roman economy, because it is precisely this typical null hypothesis that needs to be tested.

I propose to test the hypothesis that there was a market economy in the early Roman Empire in two stages. I will argue first that many individual actions and interactions are seen best as market transactions. Then I will argue that there were enough market transactions to constitute a market economy, that is, an economy where most resources are allocated by prices that are free to move in response to changes in underlying conditions. More technically, I will argue that markets in the early Roman Empire typically were equilibrated by means of prices.

I begin by presenting the alternatives to which market transactions are to be compared and the alternatives to which a market economy is to be compared. The logical starting point, as for so much of this literature, is Polanyi. He provided a taxonomy of interactions that has been used widely. He asserted that, 'The main forms of integration in the human economy are, as we find them, reciprocity, redistribution, and exchange'.[6] These forms describe different ways to organize the economic functions of any society. Reciprocity, as the term suggests, is a system in which people aim toward a rough balance between the goods and services they receive and those they give to others. The reciprocal obligations are determined by social obligations and tradition, and they change only slowly. This organization can be formalized, as in Malinowski's Trobriand Islanders, or simply followed with informal or implicit rules. Redistribution is a system in which goods 'are collected in one hand and distributed by virtue of custom, law, or ad hoc central decision'.[7] This system is present in units as small as households, where it is known as householding, as well as in the taxation levied by modern states. The essential characteristic is that a central authority collects and distributes goods and services. Exchange is the familiar economic transaction where people voluntarily exchange goods for each other or for money. Polanyi's categories

[6] Polanyi, op. cit. (n. 2, 1977), 35–6.

[7] ibid., 40.

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appear frequently in books about various aspects of classical antiquity, from Peacock and Williams on amphorae to Jongman on Pompeii to Garnsey on food.[8]

Polanyi's definitions of these different forms of integration are appealing, but imprecise. They suggest three models of interaction; we need to make them precise enough that we can choose between them. Pryor proposed tests in a study of primitive and peasant economies that can be used to differentiate Polanyi's forms of integration.[9] Pryor distinguished between what he called exchanges and transfers. Exchanges are balanced transactions where goods or services are exchanged for other goods or services of equal value. This, of course, is the kind of behaviour most often observed in markets. Transfers are one-way transactions where goods and services are given without a direct return. Grants, tributes, and taxes are all transfers. Pryor excluded 'invisibles' from this accounting, so that taxes are considered to be transfers rather than an exchange of goods or money in order to purchase social order or military success. This exclusion is necessary because one can always hypothesize an invisible gain that makes all transactions balanced. In that case, there is no way to discriminate between different forms of behaviour.

Pryor subdivided exchanges into those in which the ratio of goods or services exchanged can vary and those in which it cannot. The former may or may not involve money; the latter do not. He termed the former market exchange; the latter reciprocal exchange. The use of money is a good index of this distinction, as are changes in the exchange ratio over time. In the presence of money, of course, changes in exchange ratios are expressed as changes in prices. Pryor divided transfers into centric and non-centric ones. Centric transfers are between individuals in a society and 'an institution or an individual carrying out a societal-wide role'.[10] In the Roman context, large-scale centric transfers would be those with the imperial authorities. If the grain to feed Rome were provided by taxes or tribute, this would be a centric transfer. If the grain were obtained by purchasing it with money, then this would be a market exchange.

These categories are observable, that is, they provide boxes into which activities and societies can be placed with confidence. They also correspond closely to Polanyi's forms of economic integration. Polanyi's first form, reciprocity, is composed of Pryor's non-centric transfers and reciprocal exchanges. His second form, redistribution, is accomplished by centric transfers. His third form, exchange, is characterized by what Pryor called market exchange. In fact, Pryor's project can be seen as a way to make Polanyi's classification empirically testable, not necessarily reaching Polanyi's conclusion that 'price-making markets [are] the exceptional occurrence in history'.[11]

This tri-part schema corresponds also to a division of individual behaviour. I have argued that people even today rely on a mixture of behavioural modes, choosing which one to use as a result of internal and external forces.[12] These forces can be represented on two dimensions. One dimension measures internal forces along an index of personal autonomy. The other dimension indexes the rapidity of change in the external environment. When people are less autonomous and change is slow, they typically utilize customary behaviour. When change is rapid and personal autonomy is neither very high nor very low, then people use command behaviour. When personal autonomy is high and the pace of change is moderate, people employ instrumental behaviour, that is, they have explicit goals in mind and choose actions that advance their plans. These different modes of behaviour correspond to the three types of organization used in economic life. Customary behaviour generally is used for non-centric transfers and reciprocal exchanges, that is, reciprocity. Command behaviour is typical of centric

[8] D. P. S. Peacock and D. F. Williams, *Amphorae and the Roman Economy* (1986); W. Jongman, *The Economy and Society of Pompeii* (1988); P. Garnsey, *Famine and Food Supply in the Graeco-Roman World* (1999).

[9] F. L. Pryor, *The Origins of the Economy: A Comparative Study of Distribution in Primitive and Peasant Economies* (1977).

[10] ibid., 34.

[11] W. G. Neale, 'The market in theory and history', in K. Polanyi, C. M. Arensberg, and H. W. Pearson (eds), *Trade and Markets in the Early Empires* (1957), 371.

[12] P. Temin, 'Modes of behavior', *Journal of Economic Behavior and Organization* 1 (1980), 175–95.

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transfers, that is, redistribution. And instrumental behaviour is used in market exchanges.

Consequently there are two types of tests we can use to discriminate between the various kinds of integration. Prices are used in market exchanges, but not in non-centric transfers. They may appear in reciprocal exchanges, although they will not vary in response to economic conditions in that context. Variable prices then can be used as markers for the presence of market exchange. Phrased differently, we can infer from the existence of prices that market exchange more closely describes the interaction containing the prices than reciprocity or redistribution. Of course, we will need to make sure that these prices can vary over time to make sure that the prices are not simply stable markers of a non-centric exchange, that is, a specific type of reciprocity.

In addition, people will behave instrumentally in market exchanges, not customarily or by command, since these two modes of behaviour are typical of reciprocal and redistributive organizations. Thoughts are observed far less easily than prices, although ancient sources often report the former more volubly than the latter. Nevertheless, we can ask when ancient authors describe their activities if they are describing instrumental, customary, or command behaviour. We do so by comparing how well each model of behaviour fits the described actions or the imputed thoughts.

The analysis so far tells how to find market exchanges in the early Roman Empire. But how many market exchanges are needed to make a market economy where most resources are allocated by prices that are free to move in response to changes in underlying conditions? There is no general answer to this question, for most economists deal with market economies and have no need to test its very existence. It is necessary to compare Rome with other economies to see the nature and extent of market exchanges in market economies. England and Holland in the seventeenth and eighteenth centuries, shortly before the Industrial Revolution, had economies that everyone agrees were market economies based on agriculture. Yet even in these market economies, a substantial part of marketed output was allocated by centric transfers rather than by market exchanges. Taxes in Britain were over ten per cent of national income, and taxes in Holland were over forty per cent of the income of unskilled labourers, of which about half came from excise taxes on goods consumed by workers. Some market exchanges also had characteristics of reciprocity and customary behaviour. Large public works in both countries, primarily to drain land and (in Holland) contain the sea, were paid for by wealthy men, mostly but not exclusively large landowners. Nominal wages stayed constant for many years at a time in the market economy of early modern England, even though the price of grain fluctuated widely, suggesting that the 'labour market' was at least partly an oxymoron; the employment relation was often reciprocal exchange.[13]

Even though there were extensive non-market transfers and exchanges, most resources in pre-industrial Britain and Holland were allocated by markets. This can be seen by contrasting them with economies that were not primarily market economies. The feudal economy described by Marc Bloch was a customary economy.[14] Most transactions were made without prices as tenants worked on the lord's land part of the time and as vassals entertained lords to show their fealty. In addition, many transactions were centric transfers as tenants and vassals transferred resources — their labour or the produce of their tenants' labour — to lords in return for protection in the chaotic world of the medieval period. As obligations were written down and then commuted into money payments, the customary feudal economy developed into early modern market economies.

Centrally planned economies in twentieth-century Russia and China were command economies. Russian industries and Chinese farms were compelled to deliver quantities of goods according to a central plan. Prices in the Soviet Union were fixed for long periods of time. Planners expected firms to innovate out of the love of socialism.

[13] H. Phelps Brown and S. V. Hopkins, *A Perspective of Wages and Prices* (1981); P. K. O'Brien, 'The political economy of British taxation, 1660–1815', *Economic History Review* 41 (1988), 1–32; R. Floud and D. N. McCloskey, *The Economic History of Britain since 1700, Vol. 1: 1700–1860* (2nd edn, 1997); J. de Vries and A. van der Woude, *The First Modern Economy: Success, Failure, and Perserverance of the Dutch Economy, 1500–1815* (1997).

[14] M. Bloch, *Feudal Society* (1961).

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When that did not work, they set a higher, but still fixed, price for 'new goods'. Not surprisingly, many old goods were relabelled as new goods, and there was no increase in innovation.[15] There were not even prices in the countryside of China until quite recently, as far as we can see, only production quotas. Only now that market reforms are being introduced are farmers selling produce for a price instead of delivering a quota.

There is no formal test to decide which kind of economy we are observing. The classification of these few economies should appear clear, which of course is why they were chosen. But for an economy about which we have fewer preconceptions we will need to ask several questions. Do the most important commodities, like food and lodging, have prices that move? Are there many transactions in which price appears to play a large part? Do prices move to clear markets?

MARKET EXCHANGES AND A MARKET ECONOMY

There are many sources for the history of Rome, but they are curiously silent on questions of economic organization. Literary evidence does not suggest a focus on economic affairs in ancient Rome, but then it does not have this focus today. If all we knew about the modern economy came from the files of the *Times Literary Supplement* or the *New York Review of Books*, we would be hard-pressed to understand the economic institutions that enabled the authors represented in these publications to pursue their literary interests. In addition to being limited, the literary evidence we have was compiled by medieval scholars who were uninterested in market activity. Greene argues that the literary evidence used by Finley in *The Ancient Economy* fails to reveal the technological progress in the ancient world that is visible in the archaeological record.[16] I argue that there is economic information in the literary sources when interpreted in the proper context.

We observe isolated prices for many Roman goods, but we lack continuous series of comparable prices for goods and services, as many historians have noted. Markets do not generate a permanent record of changing prices; price series exist only if someone or some agency had an interest in collecting them. Newspapers reported prices in pre-industrial Europe and America, but we do not have newspapers from ancient Rome. (The most complete ancient price series, ironically, comes from Babylon.)[17] We do have abundant evidence that many goods and services had prices.[18] Tenants paid rent on their apartments in Rome, employers paid wages to free workers and rent for slaves, travellers paid for food and drink for themselves and their animals.[19] These are the ordinary prices of a market economy, showing that many of the goods and services used in the course of ordinary life were valued by price and paid for by money. The Diocletianic price control edict of A.D. 301 attempted to fix a wide variety of prices.[20] It was not as extensive as, say, the Preisstop Decree issued by the Nazis in the twentieth century,[21] but it reveals that there were flexible market prices that the authorities wished to control.

The abundant evidence of Roman coinage testifies to the common use of coins as a means of payment. The issue here is not the size of the money supply — a contentious issue — but rather whether it makes sense to speak of a money supply at all. Howgego

[15] J. S. Berliner, *The Innovation Decision in Soviet Industry* (1976).

[16] K. Greene, 'Technological innovation and economic progress in the ancient world: M. I. Finley re-considered', *Economic History Review* 53 (2000), 29–59.

[17] A. L. Slotsky, *The Bourse of Babylon: Market Quotations in the Astronomical Diaries of Babylonia* (1997).

[18] A. C. Johnson, *Roman Egypt to the Reign of Diocletian* (1936); R. Duncan-Jones, *The Economy of the Roman Empire: Quantitative Studies* (1982); D. Rathbone, *Economic Rationalism and Rural Society in Third Century A.D. Egypt* (1991).

[19] *CIL* IV.138; Cicero, *De officiis* 1.42; Tacitus, *Annals* 6.13, 12.43; *CIL* IV.1679.

[20] *CIL* III.805–9.

[21] Reichskommissar für Preisbildung, 'Mitteilungsblatt des Reichskommissars für die Preisbildung', 1937–38 (Bundesarchiv RD13/I).

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argued that coin was used for transactions throughout the Roman Empire.[22] Egypt was fully monetized, and he asserted that records of transactions in other distant areas showed them to involve money rather than barter. Even in the countryside, people carried coin while travelling. It seems obvious that they carried coin in anticipation of spending their money buying goods and services in market exchanges.

In addition to prices for goods and services for immediate delivery, we have many examples of loans. One example, from a Dacian gold-mining village in A.D. 162, shows a common form:

> Julius Alexander, the lender, required a promise in good faith that the loan of sixty denarii of genuine and sound coin would be duly settled on the day he requested it. Alexander, son of Cariccius, the borrower, promised in good faith that it would be so settled, and declared that he had received the sixty denarii mentioned above, in cash, as a loan, and that he owed them. Julius Alexander required a promise in good faith that the interest on this principal from this day would be one per cent per thirty days and would be paid to Julius Alexander or to whomever it might in the future concern. Alexander, son of Cariccius, promised in good faith that it would be so paid. Titius Primitius stood surety for the due and proper payment of the principal mentioned above and of the interest. Transacted at Alburnus Maior, 20 October, in the consulship of Rusticus (his second consulship) and Aquilinus.[23]

We have many other records of loans, not always so complete. For example, in A.D. 141 a woman loaned 3,500 drachmae to another woman in Egypt for one year at the same interest rate, 420 drachmae for a one-year loan, by a draft on a private bank.[24] This loan is noteworthy because it extends the previous example in several dimensions while recording an essentially similar transaction. The Egyptian loan was between women and effected by a bank draft, suggesting an even more sophisticated market transaction than the Dacian loan.

The rate of interest on loans varied, showing that these loans were not at a traditional level, but not all rates are found. The interest rate was almost always in the range of four to twelve per cent, seldom higher than the rate in these provincial loans. This range may reflect a prohibition on loans at more than twelve per cent, although Andreau argued that our evidence for a legal limit is not strong.[25] When the interest rate was higher, it typically was not fifteen or sixteen per cent, but twenty-four or forty-eight per cent.[26] The variation shows that these loans were not a reciprocal exchange at a fixed rate; they were market exchanges. The apparent absence of intermediary rates suggests that the Romans may have had difficulty calculating rates. They quoted them on a monthly basis, as in the loan described here, and the most common rates were multiples of twelve. Monthly rates tended to range from simple fractions to three or four per cent, perhaps because lenders used Roman numerals. Roman markets could not operate with the precision of modern markets, but that does not mean they did not operate at all.

Other aspects of the Dacian loan transaction testify to its market nature. It is a loan of coin, demonstrating again that money was used commonly in the early Roman Empire. Prices, in other words, were not simply accounting units; they were used in economic exchanges. The loan was guaranteed by a third person, showing that it was not just a social act between the two principals. It was even assignable to an unspecified person, as revealed by the statement that interest might be paid to someone other than the lender. This loan was not negotiable in our modern sense, but it had some sophisticated financial attributes. The loan was written down to provide a written record in case the lender defaulted; the effort of recording the loan was only worthwhile if there was recourse to a court in that eventuality. The loan was a binding contract, not a social obligation mediated by social pressure. This loan was made north of the Danube river,

[22] C. Howgego, 'The supply and use of money in the Roman world 200 B.C. to A.D. 300', *JRS* 82 (1992), 1–31.
[23] *CIL* III.934–5.
[24] *P.Tebt.* II.389, quoted in J. Rowlandson, *Women and Society in Greek and Roman Egypt* (1998), 254–5.
[25] J. Andreau, *Banking and Business in the Roman World* (1999), 90–4.
[26] Cicero, *2 Verr.* 3.165–70: Brutus' loan to Salamis in Cyprus.

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far away from Rome, showing that market activity was not restricted to the city of Rome alone.

Were the interest rates for loans connected to other interest rates? Duncan-Jones discussed the outstanding evidence on the profitability — his word — of Roman agriculture.[27] He employed the records of over one hundred perpetual foundations set up to fund government child-support grants (the *alimenta*) in many Italian towns in the second century to calculate interest rates. They ranged, with only very few exceptions, from five to twelve per cent; Duncan-Jones could not detect trends by the size of foundations nor the dates from the limited data. Andreau argued that the interest rate on loans was typically higher than the return on land and explained the difference by the greater risk in lending money.[28]

The concepts of profitability and interest rates make sense within market economies; these are market concepts. Andreau may have been indulging in anachronistic reasoning when he argued that higher-risk investments earned higher returns, but the literature on loans only makes sense if ancient Romans could choose to invest their money in different ways, that is, if they were not constrained by command or custom. Clark used exactly this kind of evidence to argue about interest rates in seventeenth- and eighteenth-century England. He presented data on the profitability of English agricultural foundations to contest an assertion based on the rate of interest on government loans. He did not need to defend the proposition that investors would both be able and want to put their money in the asset that would earn the highest return.[29]

It is hard to know how one could interpret the Roman evidence on interest and profit as part of a reciprocal or redistributive organization of economic activity. The similarity between the rate of interest on the Roman agricultural foundations and the rate for monetary loans suggests strongly that there was a capital market in ancient Rome. A prosperous ancient Roman looking to either lend or borrow could look either to urban loan companies or to agricultural foundations, at least in Italy. This does not mean that Rome had a capital market that resembled a modern banking system, only that there were market transactions organized in a way that allowed people to choose the kind of economic activity in which they wanted to participate.

Can we find evidence of instrumental behaviour that suggests how ancient Romans regarded these prices? According to Plutarch, Cato 'used to lend money in what is surely the most disreputable form of speculation, that is, the underwriting of ships. Those who wished to borrow money from him were obligated to form a large association, and when this reached the number of fifty, representing as many ships, he would take one share in the company'.[30] Cato's activities, even if not reported completely accurately by Plutarch, presuppose that a variety of market conditions existed even in the mid-second century B.C. Maritime loans were a matter of routine; there were ship-owners who needed credit to finance trade, and there were lenders who had capital to invest. Ship-owners formed companies, and these associations apparently could be responsible for several ships, even if not quite fifty. There were multiple investors in such companies, for Cato was only one among an unknown number of other investors.

Plutarch's account also reveals quite sophisticated instrumental behaviour. The risk in maritime loans was well known, and Cato understood that diversification reduces risk. He used diversification to reduce his risk by buying a small share of many ships instead of owning one or more ships by himself. This is the same kind of behaviour that a modern investor uses when buying a mutual fund. We cannot suppose that Cato had the range of investments open to him that a modern investor has or that he knew the theories of diversification that have been formulated in the twentieth century. We must, however, conclude that his behaviour was not command or customary; it was instrumental as he tried to earn money in a market context. And Plutarch's reference to fifty other investors suggests that Cato was not alone. We do not know at this point whether such investments were restricted to the city of Rome itself or were available

[27] Duncan-Jones, op. cit. (n. 18), 132–8.
[28] Andreau, op. cit. (n. 25), 94.
[29] G. Clark, 'The political foundations of modern economic growth: England, 1540–1800', *Journal of Interdisciplinary History* 46 (1996), 563–88.
[30] Plutarch, *Cato the Elder* 21.5–6.

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more generally in the Empire, although interest-bearing loans were being made as far away as Dacia in the second century A.D.

I conclude therefore that we have ample evidence of extensive market prices and exchanges in the Principate. This view agrees with that of some other recent historical research. Rathbone provided a careful analysis and discussion of Egyptian prices, noting that the paucity of extant prices made any conclusion about them tentative. He argued none the less, 'As far as we can judge, the prices for wheat, wine and donkeys were basically formed by the operation of free-market forces, that is the fundamentals of supply and demand in a monetised economy . . . The prices in private sales seem, on the whole, to be "real" prices arrived at individually by market bargaining rather than being standardised, customary or notional prices.'[31] In terms of the model used here, the prices represent extensive market exchanges typical of a market economy, not reciprocal exchanges typical of an economy based on reciprocity.

It is not enough, however, to show that prices were widespread. Prices affect the allocation of resources in market economies, and we need to have evidence of this causal relationship as well as indications of the prices themselves. An inscription from Lete in Macedonia in Hadrian's time shows that prices equilibrated grain markets.

> The city celebrates Manius Salarius Sabinus, a gymnasiarch and benefactor, who very often in times of shortage sold grain more cheaply than the current price and when the emperor's army was passing through, provided for the *annona* 400 *medimnoi* of wheat, 100 of barley and 60 of beans, plus 100 *metretae* of wine, much cheaper than the current price.[32]

The inscription celebrated an intervention in a functioning market when prices rose in response to the added demand as the army was passing through. In normal times, people could buy food in markets; only in extraordinary circumstances was unusual activity called for and celebrated. Grain and other food shortages caused the price of foodstuffs to rise, and the city's benefactor sold food at a lower price to alleviate the shortage. Price equilibrated the markets for grains and other food, in other words, but people were not always happy with the price needed to produce this equilibration. Even today, the question is posed whether government should intervene to offset a market price when the price of an important commodity like oil rises sharply.

The biggest markets for food, if they were markets, were in the city of Rome. The city's population in the Principate is generally estimated at about a million inhabitants. Rome in the early Roman Empire therefore needed a lot of supplies — 20 to 40 million *modii* of grain a year, about 150–300,000 tons, plus extensive supplies of oil and wine.[33] It was far cheaper to ship food across the Mediterranean than over land — as it would remain until the advent of the railroad. Grain was shipped over the sea to Rome from Sardinia, Sicily, Africa, and Egypt. Oil was exported to Rome from Spain and Africa.[34] The Mediterranean was 'closed' by bad weather for four months a year from November until March, and dangerous for about two additional months on either side. There must have been a large amount of shipping coming in and out of Ostia during the summer, even though large ships went to Puteoli in the Bay of Naples, where grain was trans-shipped into smaller vessels for the coastal trip to Ostia.

How was this shipping organized? If this grain was offered to Rome as tribute or had been commandeered directly by Roman authorities, then this movement of grain was a centric transfer. If this movement resulted from sales of grain by farmers, it was composed of a series of market exchanges even if the grain was purchased from tax revenues. Hopkins began his discussion of the Roman economy with the 'unexceptional' proposition that most Roman taxes were paid in money. He noted that there were taxes of grain in kind from Egypt and Africa, used for free distribution in Rome — the *annona*, but only a small part of the grain imported into Rome (perhaps fifteen per cent)

[31] D. Rathbone, 'Prices and price formation in Roman Egypt', *Economie antique, Prix et formation des prix dans les economies antiques* (1997), 211.
[32] Quoted in Garnsey, op. cit. (n. 8), 247–8.
[33] G. Rickman, *The Corn Supply of Ancient Rome* (1980), 10; Garnsey, op. cit. (n. 8), 191, 231.
[34] D. J. Mattingly, *Tripolitania* (1995).

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was for free distribution.[35] Rickman argued that the grain for the *annona* was purchased with public funds, but Garnsey and Sirks stayed with the 'prevailing view' that grain for imperial distribution was collected separately from other taxes and in kind.[36] The bulk of grain imports, not destined for the *annona*, must have been privately owned. The imports were too large to have been arranged by custom or reciprocity. If they were the result of redistribution, the Roman authorities would have had to use an extensive bureaucracy to manage the huge flows of grain and oil. There is no evidence that the imperial government had the requisite large bureaucratic administration.

Italian farms were exempt from taxation, and they sold varied products to Roman and other urban consumers in market exchanges. Many examples of Italian farmers selling their produce in the early Roman Empire have survived. The farmers sold, not to get money to pay taxes, but to pay rent and buy articles they did not produce themselves. Italian farmers could transport their goods to an urban market and sell them there, hire ships or space on ships to carry their produce to market, or sell their crops to middlemen at the farm gate.[37] Cato, writing over a century before the Principate, reported sample contracts for the sale of olives, grapes, and wine. The question of who bore the risk of wine spoilage was addressed explicitly in the contract of sale.[38] These transactions were exchanges, not unidirectional transfers, and they were market exchanges as well. The distinction between market and reciprocal exchange is whether the rate of exchange — the price — can vary. There were no traditional or fixed rates of exchanges in these cases. There were prices that could vary and payments in money. The exchanges were market exchanges, that is, purchases and sales.

Rathbone argued that market activity existed in rural areas as well as urban, at least in Egypt. The records he found for estates in Egypt were replete with prices for myriad goods and services. Not only were there prices for grain and for donkeys, but also prices for services offered by various craftsmen and workmen. Rathbone concluded that the Appianus estate was composed of many parts whose activities were coordinated to exploit economies of scale, aided by a sophisticated accounting system that was in the spirit of double-entry bookkeeping.[39] The estates whose records have survived were connected to and part of a market economy.

Moreover the ships used to transport grain were not the property of the imperial state. They were not, like the army, operated directly by the state. The operation was far too complex for the small bureaucracy at the head of the Empire, and ships — like land — were privately owned. Rickman stated baldly that 'private enterprise was the backbone of the whole business' of shipping grain to Rome.[40] It was the context in which Cato operated.

How did one engage a ship in the early Roman Empire? 'The Romans had the habit of inviting tenders from the highest bidder to farm out much or all of what the State needed, by way of a contract, a *redemptura*.' Shipping contracts with *navicularii*, people making commercial use of ships, were used to obtain grain for the imperial distributions — the *annona* — in Rome. A *navicularius* could appoint a *magister navis* to accompany the ship in his place, and he could form a *societas* which could survive the death or bankruptcy of one of its members. Contracts usually were for five years.[41]

These arrangements do not sound like command behaviour or centric transfers; bidders are not following orders, and contracts are not commands. The arrangements also do not appear to be reciprocal exchanges or non-centric transfers, that is, Polanyi's reciprocity. As with the grain itself, the sheer scale of the shipping required to feed Rome would have required a large bureaucracy to maintain a set of fixed exchanges that would accomplish the needed task. In addition, ancillary records are consistent with market exchange, not reciprocity. For example, there were maritime loans to finance shipping with insurance provisions. The loans had an interest rate at which they were to

[35] Hopkins, op. cit. (n. 4); B. Sirks, *Food for Rome* (1991), 21.
[36] Rickman, op. cit. (n. 33), 40–2; Garnsey, op. cit. (n. 8), 232; Sirks, op. cit. (n. 35), 25.
[37] N. Morley, *Metropolis and Hinterland* (1996), 159–74.
[38] Cato, *Agr.* 144–8.
[39] Rathbone, op. cit. (n. 18), 396–401.
[40] Rickman, op. cit. (n. 33), 27–8.
[41] Sirks, op. cit. (n. 35), 25–33.

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be repaid, but there was no obligation to repay if the ship was lost. In other words, the lender shared the risk of shipping with the ship-owner and the owner of the ship's contents. The interest rate was high in order to compensate the lender for bearing this risk.[42] This is a sophisticated economic transaction.

The organization of Mediterranean trade in the early Roman Empire appears to resemble the organization of trade in the New England colonies around 1700. There too ship-owners combined with others so that ships were owned by multiple investors. Most investors owned shares in only a few ships, three or fewer, but a few rich men owned shares in up to seventy ships. In colonial New England, the associations of investors typically lasted only for a single voyage. The investors varied among voyages, although the repetitions of subgroups in these shifting combinations reveals the existence of stable investment groups.[43] We do not know if Roman companies had longer lives than their colonial New England counterparts, but conscious diversification to reduce risk can only be instrumental behaviour designed for market exchanges.

The financial system in the early Roman Empire also had some of the attributes of a modern monetary system. There was even a liquidity crisis in A.D. 33 in which interest rates rose, loans were called in, and land prices collapsed. Tiberius made available a substantial sum of money to be loaned to landowners without interest for three years to restore liquidity.[44] This crisis exposed several aspects of the Roman economy. Members of the aristocracy were borrowing freely. Loans were not restricted to specific activities, but pervaded all ranks of Roman life. The price of land was not fixed. It was a market price that could fall when putative sellers outnumbered buyers. People with land could sell as they wished, and people could buy if they had the money. This well-documented financial crisis demonstrates clearly that prices were used to equilibrate both the financial and land markets.

It seems likely that almost all farmers were aware of market prices. We do not have many records from the most humble of farms, but even they do not seem to have been isolated householding cocoons. They were not fully autarchic, whatever their aims may have been. They paid taxes, they sold produce and bought items even though most of their consumption was of homegrown food. As always, records from Egypt are more abundant; they suggest that market activity extended all the way down the economic ladder. 'Other incidental evidence from the Heroninos and related archives shows that the rural poor often functioned economically as family units whose members simultaneously engaged in a wide range of activities, including farming small plots of owned or leased land, leasing animals and utilities such as presses and bathhouses, fixed-term and casual labouring, petty retailing, fishing, domestic crafts and so on.'[45]

Wherever information on production and consumption has survived, so has evidence of market exchanges. It would be strange indeed if farmers and craftsmen operating in this context did not take these prices into account when planning their activities. Roman prices, in other words, contained information about the availability of goods and even about the advantage to be gained from selling farmers' own produce. This is the role of prices in a market economy.

The responsiveness to prices can be demonstrated from the actions of upper-class Romans as well. We do not learn about their petty purchases, as we would not hear of the Rothschilds' laundry bills. But we do see them buying and selling land, as illustrated by the liquidity crisis of A.D. 33. These transactions were clearly market exchanges. The price of land changed, and senators were sensitive to changes in the price. They were not engaged in informal transfers or fixed, repetitive reciprocal exchanges when they purchased land. Nor did they seem to be following orders from a central authority that would be typical of command behaviour and centric transfers.

A detailed land register from Italy, the Trajanic inscription from Veleia, shows that much Italian land was privately held and could be valued in monetary terms. Typically

[42] Andreau, op. cit. (n. 25), 54.
[43] B. Bailyn and L. Bailyn, *Massachusetts Shipping, 1697–1714: A Statistical Study* (1959).
[44] Tacitus, *Annals* 6.16–17; Cassius Dio, 58.21.1–5; Suetonius, *Tiberius* 48.1; quoted in C. Rodewald, *Money in the Age of Tiberius* (1976), 1–3.
[45] Rathbone, op. cit. (n. 18), 393.

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estates were composed of discrete holdings that had been acquired through inheritance, marriage, and purchase. These parcels could be aggregated by summing their values to get an overall valuation. But the average value of different parcels in this area varied 'remarkably little', even though the number of parcels owned varied a lot.[46]

A roughly uniform price of land in a given region does not seem odd to us. We live in a market economy where arbitrage and other market activities tend to bring prices for similar goods and services into a narrow range. Some prices approach uniformity more completely than others, but markets tend to bring all prices together. Remarkably small local variation in Roman land prices could have come about by accident, but the uniformity does not appear to have been the result of chance. Far more likely, it was the result of market exchanges, that is, of purchasers rushing to buy land that was offered cheaply and thinking long about buying expensive land. Of course, land is not homogeneous, and there is no reason to expect the price of all land even in a local area to be the same. Local variation, however, appears to be the result of market conditions rather than of traditional or ritual forces.[47]

Senators' land-holdings were routinely valued in monetary terms. Pliny bought land adjacent to his main estate at Tifurnum to consolidate the scattered parcels he had acquired from inheritance and marriage.[48] As before, Pliny's purchases show that land ownership was neither traditional and bound by inalienability rules nor centrally directed. The primary productive asset of ancient Rome was allocated by the market. Landed estates in the market economy of pre-industrial Britain were subject to more restrictive rules than those of ancient Rome.

LIMITS TO A MARKET ECONOMY

It is a common view that prices should be equal in a market. But the law of one price may not hold in any real market. Even in modern markets, costly transportation keeps prices not only apart, but unco-ordinated. For example, residual oil is heavy and costly to transport even today. As a result, 'The various regions may be in a common market over long periods but that is not the case in periods of one to three years'.[49] Most traded goods in the early Roman Empire were similar. Transport, even when cheap, was slow. Information travelled at the same slow speed as goods in transit. There was no way for arbitrage to bring prices together in short periods, perhaps even in one to three years. If there was a market, the levels in different regions should not have differed from each other very much on average, but they need not have moved together in any given month or even year.

The market conditions under which prices tended to a common value were fulfilled in the early Roman Empire. The rate of interest, as noted above, was similar across the whole Empire. The price of land was similar in a local region. But there is no reason to expect prices of all goods to be uniform across the extensive Roman Empire. The speed at which news travelled from Rome to Egypt was highly variable, judging by the delays in changing dates to correspond to a new emperor. The delay could be as short as a few weeks, but it averaged over a month. In the winter the news could take far longer to cross the sea, but there is not enough surviving evidence to confirm the expected seasonal pattern, even though the scattered evidence is consistent with such a seasonal pattern.[50] Arbitrage could not have equalized prices in Rome and Egypt in any short period.

Surviving prices also tend to be for places that were accessible by water. Ships could carry bulky goods across the Mediterranean and up rivers, but it was hard and expensive to carry them over land. Roman roads were not primarily for the transport of

[46] *CIL* XI.1147; R. Duncan-Jones, *Structure and Scale in the Roman Economy* (1990), 127.

[47] P. W. de Neeve, 'The price of agricultural land in Roman Italy and the problem of economic rationalism', *Opus* 4 (1985), 77–109.

[48] *Ep.* 3.19.2–3.

[49] G. J. Stigler and R. A. Sherwin, 'The extent of the market', *Journal of Law and Economics* 28 (1985), 576.

[50] Duncan-Jones, op. cit. (n. 46), 9–11.

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goods, and they did not go everywhere. Wagons off the roads moved with far greater effort and diminished speed.[51] The result is that inland locations were less firmly connected to the general market. To a first approximation, the Roman market for bulk commodities extended only slightly beyond where ships could go, although high-value goods could travel to land-locked destinations. It is not surprising that there was little market activity in second-century Vindolanda, an army camp near Hadrian's Wall, although accounts there were kept in denarii, showing that the camp was connected to other markets, even if not very closely.[52] The fourth-century accounts at the Dakhleh Oasis (ancient Kellis), 300 km from the Nile, report valuations of bulk commodities out of touch with those in the Mediterranean economy. The accounts clearly considered different crops as fungible, but 'did not go so far as imposing any standard accounting across the whole of the account'.[53]

In addition to geographical limitations, a market is limited in its internal extent. Even in a market economy, all transactions need not be market exchanges. In fact, it is hard to conceive of an economy composed entirely of market exchanges. A market economy is one in which market exchanges are the modal economic interaction, but even full-blown modern market economies do not channel all transactions through markets. Eisner calculated that one-third of economic activity in the United States today takes place within households, that is, in householding or reciprocal activity.[54] Taxes also are large in modern societies, typically reaching one-third of marketed output in advanced industrial societies. Yet these clearly are market economies. They acquire this attribute, not by the universality of market exchanges, but by the prominence of market exchanges in transactions between unrelated private people and enterprises and by the importance of these transactions in the economy as a whole. These are the dimensions along which comparison with ancient Rome must be made.

In modern, industrial economies almost no one produces the food that he or she eats or the clothes that he or she wears. In an agricultural economy far more than one-third of economic activity would be carried on within households. If about seventy-five per cent of the population of the Roman Empire was engaged in farming, then it is not unreasonable to suppose that over half of production was carried on by householding, rather than by market exchanges. This does not mean that almost all farmers were autarchic and isolated from market forces, while the surplus to feed urban dwellers was produced by a minority of farms. It means that most of each farm's activities were devoted to maintaining its workforce. The historical question is how many of these farms were engaged in buying and selling produce, even if these exchanges provided only a small part of the farm's income.

This is an exceedingly difficult question to answer, particularly since our sources are biased. We are much more likely to have records of farms that were engaged in economic exchanges than those that were not, if only because the autarchic farm had no need to record its activities. The farms whose records have survived, however, tell a uniform story. These farms were all engaged in market exchanges, as described earlier.

This point about the bias of our records can be turned on its head. Although market activity was only a minority of all productive activity, it was the dominant mode of activity of 'literate Rome'. People who had some wealth and education and left records were all operating in market contexts. It is not unfair to say that market exchange was the dominant mode of interaction in 'literate Rome', even though it may have been less apparent in the daily lives of more humble Romans. It would be a mistake to ignore these less fortunate Romans, but even more unfortunate to throw the baby out with the bath water. Roman history is written almost exclusively from literate records of various sorts. For the people who left these records, market exchange was a way of life.

Finally, markets are not outside society. They are, as Polanyi stated, embedded in society, determined by society. Not all market economies are the same even today, as

[51] R. W. Bulliet, *The Camel and the Wheel* (1975).
[52] A. K. Bowman, *Life and Letters on the Roman Frontier: Vindolanda and its People* (1998); A. K. Bowman and J. D. Thomas, 'New writing tablets from Vindolanda', *Britannia* 28 (1996), 299–328.
[53] R. Bagnall, *The Kellis Agricultural Account Book* (1997), 57–62.
[54] R. Eisner, *The Total Incomes System of Accounts* (1989), 26.

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even a casual comparison of Japan and the United States suggests.[55] Economic exchanges did not dominate the intellectual life of Rome, and there were no academic analyses of these exchanges akin to modern economics. But economic exchanges were an omnipresent aspect of urban life, and they seem also to have been part of life in the countryside as well. They were an integral part of the arrangements that enabled Rome to grow to a million inhabitants and that knit the many parts of the early Empire together.

CONCLUSION

I have compared the economy of the early Roman Empire with the three forms of economic integration described by Polanyi and made testable by Pryor. The modal form of economic integration was market exchange. This observation does not appear controversial in the literature on ancient Rome, but the generalization from specific examples is problematical. Confrontation of economic exchange with other forms of integration shows, however, that it was the only form that could have allowed the early Roman Empire to function.

I have argued further that the economy of the early Roman Empire was a market economy. Market exchange was ubiquitous, and market prices moved together in ways typical of markets, albeit imperfectly co-ordinated ones. The early Roman Empire did not have the market economy of elementary economics textbooks, but it did have the type of market economy seen in other advanced agricultural economies.

There was not a single empire-wide market for all goods, but local markets were connected together around the Mediterranean. Transportation and communication took time, and the discipline of the market was loose. But there were many economic connections between even far-flung parts of the early Roman Empire. Recent evidence indicates that Finley was wrong; ancient Rome had an economic system that was an enormous conglomeration of interdependent markets.

Massachusetts Institute of Technology, Cambridge, MA

ptemin@mit.edu

[55] P. Temin, 'Is it kosher to talk about culture', *Journal of Economic History* 57 (1997), 267–87.

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