

## On the Accuracy of Some Past and Present Forecasts

STANLEY ENGERMAN\*

*The topic of this paper has been inspired by something of particular interest to Michael Mussa, something to which he made major and important contributions while at the IMF. The biannual World Economic Outlook, published since the 1980s under the auspices of the Research Department, has, as its purpose, the provision of “analysis and projections . . . [as] integral elements of the IMF’s surveillance of economic developments and policies in its member countries, developments in international financial markets, and the global economic system.” In policy-oriented institutions (and in most businesses and individual decision making), policymaking decisions are often guided by projections and forward-looking indicators. [JEL B10, B20]*

When forecasts are accurate, rarely does someone comment, “That is what we should have expected to happen.” However, when forecasts are inaccurate, they attract attention, usually critical, often in conjunction with an attack not only on the forecaster but also on the entire profession to which he or she belongs.

To understand the nature of forecasting, and what can go right or wrong, I examine forecasts in different times and places. This is not a complete survey; forecasts and forecasting have an exceptionally long history, so for the sake of brevity, I will focus on various forecasts relevant to the history of economics and economic history, to see what we can learn about this type of exercise.

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\*Stanley Engerman is John H. Munro Professor of Economics and Professor of History at the University of Rochester. This paper was presented at the IMF conference Mussa Fest, held in honor of Michael Mussa. I benefited from the comments of conference participants, particularly Michael Bordo and James Boughton, as well as Seymour Drescher and David Eltis.

Before giving examples I want to briefly describe several different characteristics of forecasts that can go wrong, since presumably, to paraphrase the famous first line of *Anna Karenina*, there are many different reasons forecasts go wrong, but accurate forecasts are presumably all based on one single feature.

First, would we expect long- or short-run forecasts to be more accurate? Short-run forecasts require fewer projections and less information, but they may be subject to random, reversible events. Long-run forecasts can eliminate some sources of the difficulty found with short-run forecasts, but they do allow more time for shocks to occur, and, although this does not necessarily contribute to poor forecasting, more time is allowed for the undertaking of policies to offset trends and move things in a different direction.

Why are forecasts sometimes wrong? Are errors the result of endogenous or exogenous factors? (For a related discussion, see McCloskey, 1992.)

- (1) We may use the wrong model or an incomplete model. This can be referred to as the law of unintended consequences, since even if the main prediction is accurate, there are often side effects that have been ignored or overlooked that can alter the evaluation of what has happened. To firm believers in chaos theory, however, no forecasting model is acceptable.
- (2) We may fail to allow for shocks that will influence the system. This, of course, leads to two questions: (i) to what extent can shocks and their impact be forecast? and (ii) can we allow for expected adjustments to these unexpected changes?
- (3) The basic observations used in the forecast may be incorrect (that is, the underlying data may be wrong or misinterpreted), so that the forecast, while consistent with the presumed data, is wrong.
- (4) Forecasts made as part of a policy debate may be clouded or incorrect because of ideological beliefs. Problems arise because in some cases people actually believe the proposition; in other cases, these propositions reflect mainly the rhetoric of debate and are used to convince others. An example of this is the question of the relative productivity of slave versus free labor, a central issue in the eighteenth and nineteenth century antislavery debate. Adam Smith was the key figure, on the basis of his reputation, with his argument on different incentives for free and slave labor. His claims featured in later debates despite the fact that every slave owner knew about and tried to solve the incentive problem, and the ancient Greeks had worked out clever incentive schemes for differential rewards to encourage more output from slaves. When discussing slavery on British and French Caribbean islands, Smith did allow for the effects of owner behavior on a slave's performance (Smith, 1776, Vol. I, pp. 97–99 and 387–89; Vol. II, pp. 587–88; pages refer to 1976 edition). Moreover, in his antislavery argument, Smith did not note, as had others of the time, that hunger was a superb form of coercion, or as worded more subtly by his friend David Hume (1752, p. 267 in 1987 edition) that “necessity . . . is the great spur to industry and invention.” Claiming that ending slavery would raise output and lower goods prices was, of course, the better forecast with which to attract antislavery opinion. It must be noted that nearly every reform advocated is supported by both the belief that it is the

right thing to do and the expectation that it will raise GNP. One of the few exceptions comes from the early-twentieth-century debates in Australia to end Pacific Islander indentured servitude used to produce sugar, replacing it with European workers—but with large subsidies and tariff protection. In Parliament it was noted that although the policy of keeping out the Pacific Islanders would raise the price of sugar (a cost estimated equal to about ½ of 1 percent of GNP), white Australians would consider this price hike worth it (Parliament of the Commonwealth of Australia, 1912, pp. xx–xxi, 553). For the most part, however, ideology and the economic forecast seem to go in the same direction.

- (5) There is another problem with forecasts that merits more attention than it is usually given. Most forecasts take the characteristic of comparing equilibrium positions: the focus is on the present position and where the system will be in the future, in the absence of further shocks, with less attention given to how long it will take to arrive at the equilibrium. Considering the time it will take to reach equilibrium can be crucial for planning and policymaking. To demonstrate this point, I will now highlight a few cases; I will discuss others later.

Among the major opponents of southern slavery, and one of the more active politically, was the distinguished Irish economist John Elliot Cairnes. His 1862 book *The Slave Power* is still used in discussions among scholars. Cairnes (1862, pp. 274 and 350 in 1969 edition) believed that slavery was doomed and that northern free labor would prevail, but only “with the progress of time” and “by a gradual but sure progress.” He quoted the *North British Review* (February 1862, p. 142), saying even when slavery’s “doom is sealed . . . the execution of the sentence may seem to be relegated to a very distant day.”<sup>1</sup>

A more precise time frame was considered in the debates about abolishing the British transatlantic slave trade in the 1790s. It was proposed that ending slavery by parliamentary legislation would not be necessary, since once the transatlantic slave trade was abolished, on grounds of profitability, slavery would quickly end. Using land-labor ratios for Jamaica, the abolitionist William Wilberforce (1807, pp. 291–92) and Prime Minister William Pitt (see Coupland, 1923, pp. 270–74) estimated that if nothing were done by legislative or other means, it would take between 220 and 250 years for slavery to end once the transatlantic slave trade was abolished. This, clearly, was an unacceptable time frame.

Another interesting example of the importance of looking at the length of time before the equilibrium point of decline is reached comes from perhaps the most famous of the historical works on decline, *The History of the Decline and Fall of the Roman Empire*, by Edward Gibbon (Gibbon, 1776–1788, p. 177 in 1900 edi-

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<sup>1</sup>Cairnes (1862, p. 276) claims that by the time the South would “feel the restraints of its spacious prison, at least a quarter of a century would have elapsed.” His discussion of “ultimate extinction” points out that adherents may “in the end be balked of its reward.” Michael Bordo, who has written on Cairnes’s analysis of gold discoveries on mid-nineteenth-century money supplies has suggested that Cairnes did better in this study (see Bordo, 1975). Is it a mere coincidence that the prediction regarding the more morally charged issue was more problematic?

tion). He notes, in presenting his plan for his last two volumes, that, not as a historical explanation of an event that had occurred (not really a forecast) but as an explanation that does raise the relevant question, “five centuries of the decline and fall of the empire have already elapsed; but a period of more than eight hundred years still separates me from the term of my labors, the taking of Constantinople by the Turks.” It took 1,300 years, but presumably, someone got it right at some time.

A more recent discussion of a contemporary policy issue also places in perspective the importance of time frames for forecasts. Not surprisingly, the movie *The Day After Tomorrow*, about a five-day cataclysm resulting from global warming, attracted flak from those skeptical about the importance of global warming. What was surprising was the strong criticism from those in the environmental movement concerned with getting the forecast right. As described in Andrew C. Revkin’s “NASA Curbs Comments on Ice Age Disaster Movie” (*New York Times*, April 25, 2004, pp. 1–16), “Some leaders of nonprofit environmental groups are also distressed about the movie, though for different reasons. In conference calls and e-mail exchanges, they have said it so overstates the issue—turning a decades-long or century-long threat into one that explodes over five days—that it might cause people to simply laugh off the real questions.”<sup>2</sup>

One can understand the concern about overstatement. Perhaps environmentalists were familiar with the problems of one of the major religious movements in upstate New York in the 1840s (see Doan, 1987, pp. 4, 31–53, 93–112, and 202–206). The Millerites, with between 10,000 and 1,000,000 adherents, used complex mathematical procedures to estimate the date of Jesus’s return to Earth: October 22, 1844. Alas, that date passed with nothing unusual happening, and after the Day of Great Disappointment the number of active believers plummeted. The movie *The Day After Tomorrow*, however, has led to new discussions about global warming that go beyond stating equilibrium positions to describing the question of when this event might occur.

## I. Evaluating Forecasts

How does one measure and evaluate the success of forecasts? Generally, with a large enough population of forecasters considering any one issue, it is highly probable that someone will get it right, but how often is that forecaster right? What is the appropriate success rate for a forecaster? In baseball anything above 3 hits in 10 at bats is regarded as successful; in 3-point attempts in basketball, anything above 4 goals in 10 shots is excellent; and a quarterback who completes more than 5 in 10 forward passes is considered good. For forecasters, however, we generally give much less slack and anticipate much better performance. Perhaps we should focus on some weighted averages of forecasts, weights based on amounts won or lost. Does winning big only once outweigh numerous losses, or, in baseball parlance, do you want players who hit for a high average or those who hit many home runs?

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<sup>2</sup>The movie’s director later pointed to the difficulties in making “events that stretch over decades or centuries scary enough for a movie” (Andrew C. Revkin, “When Manhattan Freezes Over,” *New York Times*, May 23, 2004, Arts and Entertainment, pp. 19, 22).

After major stock market movements, the Business section of the *New York Times* generally features an interview with the guru who predicted it. He (or she) often explains in depth the analysis that led to these shrewd and insightful predictions. One point to note, however, is that the same guru very seldom appears in the paper twice.

Discussions of the forecasting skills of the boy who cried wolf, who was incorrect all times except the last, raise the question of how many incorrect forecasts lead us to disregarding the next forecast, an issue familiar to many Malthusians in the past who explained away repeated failures while still confidently anticipating the dreaded events. There is always the last refuge of a forecaster: based on Pascal's wager about whether to believe in God, an argument based on anticipations of asymmetric returns, permitting past accuracy to be irrelevant for predicting major events.

Dick Rosett, Michael's colleague, chairman, and then dean, first at Rochester and then at Chicago, reminded me of the introduction he used at the annual University of Chicago School of Business forecasting luncheon. He claimed that there were two characteristics necessary to be a good forecaster:

1. Be able to accurately and confidently predict the future.
2. Be able to accurately and confidently explain away the past.

This, of course, does not mean to suggest that only economists and economic historians have a poor track record, if and when they do. Drawing on my knowledge of sports and entertainment, there are some interesting cases to note—interesting because they involve forecasts made with what might seem to be considerable information. Professional basketball has some infamous cases: Portland choosing Sam Bowie ahead of Michael Jordan. Several years earlier Portland had made possibly the league's worst number-one draft choice by selecting a player with minimal accomplishments. In Rochester, the choice was made to draft a player named Sihugo Green, a solid but limited player, over Bill Russell, an all-time great. Perhaps coincidentally the Rochester team left town several years later. In football, three of the greatest quarterbacks of all time—John Unitas, Joe Montana, and Dan Marino—were all relatively low draft choices. Unitas was the one hundred-second player chosen and was released quickly by the team that drafted him; Montana was the eighty-second player and fourth quarterback selected; and while Marino was drafted in the first round, he was the twenty-seventh player and sixth quarterback selected that year. Drafting baseball players is much more difficult, since it is usually done earlier and with less information than in football and basketball, and so the success rate is not at all high. Before switching subjects, there is another baseball-related prediction worth mentioning: it involves the argument that baseball faces “universal bankruptcy” unless player salaries drop, since they are “swelling to unreasonable and ruinous proportions.” Bud Selig made this forecast in 2004 and in every year that he has been commissioner of major league baseball, but it was also made by one of the founders of the National Baseball League, A. G. Spalding, and other owners as early as 1881, when salaries were at about one two-thousandths of the current level.<sup>3</sup>

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<sup>3</sup>See Seymour (1960, p. 119) and Levine (1985, p. 61). In 1884 the editor of *Sporting News* claimed that without the reserve rule “the exorbitant demands” of players would “eventually bankrupt the strongest company in the professional arena” (Levine, 1985, p. 53).

There are many examples of poor forecasting from the world of entertainment. As a forecaster, would you prefer to be known as the studio executive who signed Tab Hunter to a long-term contract with the expectation that he would soon become a great matinee idol, or the studio executive who terminated the contract with Rita Hayworth, since it was thought that she lacked star quality? How about one of the twenty-odd publishers who turned down J. K. Rowling's first Harry Potter book? Rowling is now apparently the richest woman in Britain.

At some point in our professional lives, most of us are required to forecast the performance of others. Consider the case of an individual with a Ph.D. He or she has four years of college, four years of graduate school, evaluations from several teachers, a job market paper, and, sometimes, a dissertation. In many cases we accurately predict that the person with the Ph.D. will have a high level of professional success, but that is not always the case. Some people achieve more success than anticipated; others do not quite achieve what had been expected.

The case of Michael Mussa has obviously been one of great anticipation, and of great accomplishment, and all the early optimistic forecasts about him have turned out to be correct. The first opportunity I had to forecast his career came with a long—very long (close to 100 pages)—paper he wrote for Bob Fogel's economic history seminar at the University of Chicago. The subject of the paper was agrarian decline and agrarian discontent in the late-nineteenth-century United States. The combination of empirical material and analytic interpretations, and his ability to place this work in a broad context, resulted in a first-rate piece of economics and of economic history that unfortunately is still not published. Clearly, Michael was a student who would go far—that correct forecast was relatively easy to make. His paper also invited another correct forecast: it was obvious that the author of that paper would not, in his professional writing and talking, suffer from the sin of excess brevity.

## II. The Time-Duration of Forecasts

There is a famous story—probably the most famous and widely read story concerning the perils of forecasting—of an individual who it is believed was led to make the supreme sacrifice because of an incorrect forecast based on a faulty interpretation. (This ending is, of course, not to be suggested for any IMF forecasters, or indeed for any other forecasters, who are incorrect.) Chicken Little was sitting under a tree when an acorn fell on his head. He thought that the sky was falling and, displaying admirable concern for the public, went to tell the king. Along the way he picked up several others—Henny Penny, Ducky Lucky, Goosey Loosey, and Turkey Lurkey—all of whom he convinced of the accuracy and importance of this situation. (As an aside, one can't help but feel that this gathering of like-minded animals going to the king is intended to suggest another aspect of the forecasting profession, the herd instinct that often seems to develop among those making predictions.) Trouble hit the group of forecasters when they ran into Foxy Loxy, who deceived them; took them to his den, not to the king; and ate them all up. It has been suggested that Chicken Little would have been eaten even if his interpretations and forecast were correct, but I find the idea of paying for your incorrect forecasts more appealing.

Within the sphere of economics, undoubtedly the most famous and widely used forecast—one, incidentally, that thus far has often been incorrect—is that based on the Malthusian doctrine of the relationship between resources and population. Malthus was not the first to make this basic prediction; one can find similar forecasts about anticipated decline owing to insufficient resources as far back as several thousand years, but these predictions were premature and were made by individuals who no doubt lacked Malthus’s analytical and empirical ability, as well as his public relations skills.<sup>4</sup> Rather than discuss the many problems that Malthus’s forecast has presented, I describe how Malthus linked his theory of population and resources to his anticipation of the specific realization of events in a nineteenth-century British case (see Hollander, 1990). His basic question was the following: How long would it be before a lack of available resources slowed British population growth? Writing in 1803, Malthus saw the deceleration in the growth of food supplies, and consequently of population, as three or four decades ahead, a prediction left unchanged as late as the 1817 edition of *An Essay on the Principle of Population* (Hollander, 1990, p. 21). However, after the 1821 census, and by focusing on the declining marriage rate and not the slight increase in the population growth rate, Malthus put off the occurrence of the necessary (on economic grounds) deceleration until a full century had passed (Hollander, 1990, p. 24). Thus, his pessimism about real contemporary events was not as extreme as the predictions of his model might suggest (see also Wrigley, 1988). His theoretical position was consistent, based on real-world conditions, with quite different periods until its realization. Whether the minor early-nineteenth-century economist Thomas Chalmers should be classed as a Malthusian is an ongoing discussion among historians of economic doctrine (Hollander, 1985, p. 58). The positive claim that he was a Malthusian rested on his statement that there would be “ultimate ‘stationarity,’ ” since “every country has its limits.” The counterargument notes his comment that “the time may be indefinitely distant, and indeed may never come, when the absolute and impossible barrier shall at length be arrived at” (Hollander, 1985, p. 58).

### III. Forecasts of American Growth

When we examine the beginnings of settlement in the New World the predictions seem rather obvious (see Engerman and Sokoloff, 2002). Spain was the number one country in Europe, or number two depending how France is considered. For several centuries Spain was to be number one in the Americas. Columbus, commenting on the gold in Spanish territories, argued for its pecuniary benefits, since “he who possesses it, can do as he wishes in the world.” This in addition to the nonpecuniary

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<sup>4</sup>See, for example, the Carthaginian theologian Tertullian, writing in about A.D. 200, commenting that, “What most frequently meets our view (and occasions complaint) is our teeming population. Our numbers are burdensome to the world, which can hardly support us” (quoted in *Crunch Time*, “Overpopulation,” [www.crunchtime.org](http://www.crunchtime.org)). He is quoted as anticipating pestilence, hunger, war, and flood. Wilfred Beckerman (1972, p. 332) points to a possibly even earlier example, stating that “a fifth-century B.C. Club of Rome (?Athens) team would certainly have predicted the imminent end of the world by extrapolating the already growing shortage of timber resources and pointing to the over-population of Athens.”

benefits that come, because “it can even drive souls into Paradise” (Pagden, 1993, p. 17; see also Elliot, 1970, pp. 1–27). Spain (and Portugal) had a one-century lead in coming to the New World compared with England and France, and used this to good advantage, following the rule of American bank robber Willie Sutton: go where the money (and the people) are. The Spanish went to areas that contained more than 70 percent of the New World’s Native American population and that had very well developed societies, economically and politically, with great amounts of wealth. The 13 colonies and Canada were settled later, and these were considered the dregs of the Americas, rather undesirable for settlement. Even when they began to come to the New World, for the better part of a century more British migrants went to the West Indies than to the mainland. Mainland areas had only about 5 percent of the Native American population, and the Native Americans lived mostly in small units, more like hunter-gatherers than the sophisticated societies of South America. It was only after one-and-a-half centuries that the 13 colonies surpassed Latin America and parts of the Caribbean in terms of income per capita, at roughly the same time the British surpassed the Spanish on the European continent, though even 350 years after Columbus, Spain’s largest remaining New World colony, Cuba, was still wealthy, having become the producer and exporter of about one-half of the world’s cane sugar.

France had less success in the New World than did the British, even though its colony of San Domingue (now Haiti) was in 1780 about the richest area in the world. The French were not as successful in Canada as they were with San Domingue; it seems that for a long time France did not regard Canada’s prospects highly. Thus, the duc de Sully, finance minister at the start of the seventeenth century, argued against plans to settle Canada since “great wealth was never derived from places beyond forty leagues [of north latitude],” anticipating a familiar World Bank map relating climate to income level (Cole, 1939, p. 42). Much later, during the Seven Years’ War between the British and the French, Voltaire presented an interesting benefit-cost analysis, claiming that these “two nations are fighting over a few acres of snow,” and he regarded both to be “mad” since “they spend more money on this glorious war than the whole of Canada is worth,” but he does make this argument without a statement of what the appropriate rate of interest should be (Voltaire, 1759, p. 110 in 1947 edition).

Of the many forecasts made for the new American nation after it achieved independence, I will deal with only a few. One of the more accurate predictions was made by the English writer John Lord Sheffield in 1784. He claimed that “the states will suffer—they have lost much by separation,” but that, for the British “it is not probable our Commerce will be much hurt.” He believed that English manufacturing sales to the Americans would remain high, since “it will be a long time before the Americans can manufacture for themselves.” Sheffield also argued “that the commerce with the revolted colonies was of advantage to this country cannot be doubted; nevertheless it may be easily shown, that it was not the most advantageous” (Sheffield, 1784, pp. 135, 191, and 241 in 1970 edition). This forecast of continued American reliance on British manufacturing exports held for several decades, as did the importance of the American agricultural labor force, and he might have been right in the claim, made also by Edmund Burke, that England

would have been better off freeing the colonies earlier.<sup>5</sup> The economic strength of Sheffield's contention is seen in the fact that U.S. per capita incomes declined in the three decades after the start of the Revolution, while, after losing the 13 American colonies, Britain experienced a several-decades-long growth spurt that marked the period of the Industrial Revolution (Shepherd and Walton, 1976, pp. 412–414; Deane and Cole, 1962, pp. 75–82).

Two of the most intellectual and intelligent of America's founding fathers made some interesting predictions. In 1751, describing the economics of western settlement, Benjamin Franklin commented that "so vast is the territory of North America, that it will require many ages to settle it fully" (Franklin, 1751, p. 313 in 1836 edition). Fifty years later, discussing the Louisiana Purchase, Thomas Jefferson claimed that it would make it "possible [for the United States] to remain a nation of farmers for a thousand years"—that presumably being the time it would take to fully occupy the land (McDonald, 2003).<sup>6</sup> And, in 1808, when renegeing on a previous commitment for federal aid to help states build canals, Jefferson described New York State's Erie Canal as "little short of madness," given its length through wilderness (more than 10 times longer than any existing U.S. canal). To Jefferson the canal was "a century ahead of its time." Even in 1822, when the new canal was nearing completion, he stated that "many, I dare say, still think with me that New York has anticipated, by a full century, the ordinary progress of improvement" (Shaw, 1966, p. 36).<sup>7</sup>

#### IV. Forecasts About the Future of American Slavery

In the first half of the nineteenth century there were many discussions of the probable demise of slavery on economic grounds, presumably leading to a voluntary freeing by slaveowners.<sup>8</sup> Those predictions were generally based on estimates made from data relating to population, area, and resources, and all were based on one analytical principle drawn from basic economics—the law of diminishing returns.

One systematic example can be found in writings of the Virginia economist George Tucker, who also came up with some quite sophisticated national income estimates based on the 1840 census. Tucker actually presented some earlier decline estimates when he was in Congress, during the debates concerning the Missouri Compromise, in 1820. He discussed population density estimates, and he related productivity to density to evaluate the argument that for about one century "there could be no danger from the relative increase of slaves" (Tucker, 1820, p. 13). He was offended when a believer in that danger claimed that politicians should not worry

<sup>5</sup>Bentham (1995), at the start of the nineteenth century, used the British experience with the United States to argue for Spain's willingly freeing its American colonies rather than fighting against their desire for independence. Here, however, wars were fought, and independence improved British trade with South America.

<sup>6</sup>Earlier, in his first inaugural address (given in 1801), Jefferson commented that the United States was "... a chosen country, with room enough for our descendents to the thousandth and thousandth generation."

<sup>7</sup>The Erie Canal was only one of many public works, including the Big Dig, the Louisiana Superdome, and just about all preparations for the Olympics, for which there were rather large cost overruns relative to the original projections. The initial projections were often deliberately low to make the projects politically acceptable (Engerman and Sokoloff, 2006).

<sup>8</sup>Parts of the next paragraphs draw on Engerman (1993).

about this danger since it was too far in the future. Tucker claimed, however, that “an hundred years, sir, is a long period for human life, but is a short one in the life of a nation” (Tucker, 1820). (Tucker’s political career, it might be noted, was rather brief.) Two decades later, he provided a more systematic approach to the question. He looked at the conditions of population density when villenage was abolished in England, using the midpoint between the fourteenth- and seventeenth-century estimates and adjusting for differential soil fertility and living standards. Using slave and white population growth in the United States, as determined from the 1790 through 1840 censuses, he gave slavery’s future “a little upwards of eighty years” (Tucker, 1855) (although with many caveats and qualifications). Twelve years—and one census—later, and with the addition of Texas, he noted that the addition of this new state would clearly “tend to prolong the continuance of slavery”; otherwise, he claimed that “the views presented by the author in 1843 remain unchanged, as he has met with neither fact nor argument to affect their soundness” an attitude clearly worthy of any academic reply or rejoinder today (Tucker, 1855, pp. 108–18 App. 28). I know one historian who thinks that Tucker’s extension of his prediction of the demise of slavery from 80 to about 100 years reflects a political fear, in case the time of slavery’s ending would get too close and become politically relevant, but Tucker’s revision is most likely an appropriate triumph of new empirical information about the addition of Texas, rather than ideological belief.

Another example from the antebellum period relates to a position taken by Abraham Lincoln in his 1858 debates with Stephen Douglas, a position based solidly on the law of diminishing returns, and a belief in what could ultimately be called the political, not the natural, limits of the expansion of slavery. Lincoln’s position in the 1858 debates was not to touch slavery where it existed but to prevent its expansion into the territories—a position that, however sound politically, seemed to Douglas to be ill-fitting with Lincoln’s moral attacks on slavery. Douglas paraphrased Lincoln’s position as aiming to keep the slaves confined to their present limits while they continued increasing until the soil on which they lived would no longer feed them. According to Douglas, Lincoln would thus be able to put slavery in a course of ultimate extinction by “starving them to death.” Lincoln’s response was that “while it [slavery] drives on in its state of progress as it is now driving, and as it has driven for the last five years, I have ventured the opinion, and I say to-day, that we will have no end to the slavery agitation until it takes one turn or the other. [Applause.] I do not mean that when it takes a turn towards ultimate extinction it will be in a day, nor in a year, nor in two years. I do not suppose that in the most peaceful way ultimate extinction would occur in less than a hundred years at the least; but that it will occur in the best way for both races in God’s own good time, I have no doubt [Applause].” Lincoln’s concern with the founding fathers’ belief in “ultimate extension” points to another pitfall in prediction, since he states that it was put off by the unexpected invention of the cotton gin (Lincoln, 1989 edition, pp. 603–604, 677–678, 753, and 820).<sup>9</sup>

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<sup>9</sup>The 100-year expectation was held by other northerners at this time, including a leading political figure, Horace Greely (Van Deusen, 1953, p. 92).

Finally, in the discussion of southern slavery, I want to turn to a source with some contemporary resonance, the market newsletters of those slave traders in the South, who issued weekly or monthly newsletters to customers detailing the prices of slaves and providing relevant information on the expected behavior of markets and of slave prices. I will quote from two at the time of Lincoln's election, where there is some new uncertainty about slave prices but no expectation of war, something that must also have been the case at this time in the North, given the willingness of northerners to lend money to southerners.

In September 1860 Betts and Gregory of Richmond wrote, "The presidential election is having considerable effect on the market. How it will go no man can tell. But we would advice you not buy nothing but good negroes and buy them at prices to sell immediately." In January 1861 they wrote: "There is more activity in the market with an upward tendency."

Dickson Hill Co. of Richmond wrote in December 1860:

The year is about to close and it will be difficult for us to say what will be done in the ensuing years. . . . We have no hope for any political change which will give peace and some confidence in commercial matters.

The speculations and extravagances of the last three years has put up prices of land, negroes, and crops, to such a height that it could not be maintained, and the credit of the country has been extended to a degree unparalleled in this country before.

We think for some years to come Negroes will not command over \$1,000 for best men and \$800 for best women. During the incoming year we ought not to expect more than \$800 for men and \$600 for women; and we fear that even these prices will not be obtained for two or three months to come (*Slave Traders*, Duke University Archives).

## V. Forecasts About Natural Resources

After that of Malthus, probably the most famous prediction by a professional economist, also seemingly incorrect thus far, was that by William Stanley Jevons in 1865, concerning the problems to be created by the limited amount of coal in England. This is only one of a very familiar series of forecasts about the limitations of nonreproducible natural resources that have an extremely long history.

Jevons thought the limited amount of coal in England would ultimately retard England's economic progress, and he claimed that "the check to our progress must become perceptible considerably within a century from the present time," while "the conclusion is inevitable, that our present happy progressive condition is a thing of limited duration." This, he thought, would lead to "wholesale emigration" as well as possible "moral and intellectual retrogression." He concluded by offering the British "the momentous choice between brief greatness and longer continued mediocrity" (W. S. Jevons, 1865, pp. lx, 215, 316, and 349). It may be difficult to grade Jevons's forecast, since even though he was close concerning the precise timing of Britain's relative decline, his reasons for expecting retardation were not correct.

In an interesting family follow-up, Jevons's son, H. Stanley Jevons, returned to the problem about 50 years later, after the period including the one era of sharp increases in relative coal prices during the late nineteenth and the twentieth cen-

turies. He followed an analysis similar to his father's, allowing some adjustments for higher costs, and concluded that his father was quite right, but that "it is quite possible, indeed, that we shall be suffering from this degree of exhaustion of our mines in less than 200 years." He attributed the change in timing to "the discovery of far greater deposits of coal than could have been expected" (H. S. Jevons, 1915, pp. 756–57). This shift in timing from his father's approximate 100 years to his 200 years was based on the fact that more new reserves were being discovered than had been used over the previous half-century. Actually, about three decades before the elder Jevons's writing, Charles Babbage, inventor of a computing machine, had suggested that "the source of this power is not without limit, and the coal-mines of the world may ultimately be exhausted." He went on to argue, however, that because of the increased expense, "long before that period arrives, other methods will probably have been invented for producing [heat]"—possibly by drawing power from the sea (Babbage, 1835, p. 388 in 1963 edition).

Many other examples of predicted mineral and resource exhaustion are available for the United States and elsewhere, often with similar prolonged time periods, under the quite-specific assumptions of no changes in key parameters. For example, in England in 1624, Richard Eburne wrote that the supply of wood "fast decays" and "that very want of it only, within a few years is like to prove exceedingly hurtful to our land, and can be no way repaired, but by transplanting the people" (Eburne, 1624, p. 22). Timber and other mineral shortages have been predicted in the United States since at least the late nineteenth century. These predictions often were made hastily. Colonel Drake first found oil in Pennsylvania in 1859. By 1861 the fear of an exhaustion of the oil supply, if nothing was done to prevent waste, was expressed, and in 1882 the fear that oil would run out, apparently soon, was raised even when about 99 percent of all American oil came from New York and Pennsylvania (Williamson, 1945, p. 99). Earlier, in 1862, Andrew Carnegie was so convinced that oil would soon be in scarce supply that he stockpiled output, awaiting the rise in prices (Sabin, 1999, p. 475; and Giddens, 1938, p. 82). At the start of the twentieth century Andrew Carnegie forecast that coal would last for about 200 years (most others predicted 80–100 years) and that the "best half of our iron ore" would be gone in about 30 years (Williamson, 1945, p. 102). Again, it is easy to understand the logic of expecting to run out of natural resources, but, as before, the key question remains how far in the future is this expected to occur (see also Jones, 1991; and United Nations, 1973, pp. 370–73).

## VI. The Twentieth Century

I will write less about the twentieth century, since much more is known, and some issues are covered by Bob Fogel earlier in this issue. Irving Fisher's famous quote on permanent prosperity was similar to remarks made by Herbert Hoover in 1929, as chair of the Committee on Recent Economic Changes of the President's Conference on Unemployment. Hoover said, "The years 1922 to 1929 witnessed a marked increase in the physical volume of production" owing to a "striking increase in productivity per man-hour," and that "we seem only to have touched the fringe of our potentialities" (Hoover, 1929, pp. xiv and xix). Nevertheless, Hoover commented that the continuation of prosperity required both balanced change in the economy and suc-

cessful leadership (Hoover, 1929, p. xxi). The *New York World* headline of May 15, 1929, however, was more optimistic: “Prosperity Only Dawning, Hoover Survey Reports,” and repeated his comment that the “U.S. Has but ‘Touched the Fringe’ of Potentialities After Seven ‘Splendid’ Years.” Less attention was given to the caveat attributed to Hoover: that this could occur “only if the economic balance between production and consumption of wealth can be maintained” (*New York World*, 1929 p. 1). Yet even more concern was expressed in the last essay in the volumes by the director of the National Bureau of Economic Research, Wesley Clair Mitchell. Mitchell said, “All is not well. Americans have seen more uniformly fortunate time; for example, in 1906. . . . The condition of agriculture, the volume of unemployment, the textile trades, coal mining, the leather industries, present grave problems. . . . How rapidly these conditions will mend, we do not know. Some may grow worse.” Further, he predicted that prosperous industries would become unstable, and since there had been no “severe depression since 1921 [there] is no guarantee that we shall be equally prudent, skillful, and fortunate in the years to come” (Mitchell, 1929, Vol. II, p. 909). Not an unequivocal prediction of an immediate collapse by America’s leading analyst of business cycles, but not quite a repeat presentation of Fisherian unbounded optimism.

I end this twentieth-century discussion by mentioning two major forecasts that have had influence and attracted attention in the past half-century or so. First, various predictions, some by leading economists, were made during World War II that the end of the war would bring about a return of the depression (Sapir, 1949). Second, by my count, the United States was expected to be economically overtaken by at least three different countries in the second half of the twentieth century: the Soviet Union, Germany, and Japan. These are events that we are still waiting for, and while doing so, we can no doubt add China and the EU to the list of predicted overtakers.

## VII. Conclusion

To end this paper on forecasting, I searched for a more casual approach consistent with Michael Mussa’s spirit and his interests. I decided I would print what I regard as the best popular song concerning the difficulty of forecasts, by George and Ira Gershwin for the movie *Shall We Dance*. (This song is also unusual in that it is one of the few solos Ginger Rogers ever got to sing in the Astaire-Rogers movies.)

### **THEY ALL LAUGHED**

By: George Gershwin and Ira Gershwin

[Verse]

The odds were a hundred to one against me  
 The world thought the heights were too high to climb  
 But people from Missouri never incensed me  
 Oh, I wasn’t a bit concerned for from history I had learned  
 How many, many times the world had turned

[Chorus]

They all laughed at Christopher Columbus  
 When he said the world was round  
 They all laughed when Edison recorded sound

Stanley Engerman

They all laughed at Wilbur and his brother  
When they said that man could fly

They told Marconi  
Wireless was a phony  
It's the same old cry  
They laughed at me wanting you  
Said I was reaching for the moon  
But oh, you came through  
Now they'll have to change their tune

They all said we never could be happy  
They laughed at us and how!  
But ho, ho, ho!  
Who's got the last laugh now?  
They all laughed at Rockefeller Center

Now they're fighting to get in  
They all laughed at Whitney and his cotton gin  
They all laughed at Fulton and his steamboat  
Hershey and his chocolate bar

Ford and his Lizzie  
Kept the laughers busy  
That's how people are  
They laughed at me wanting you  
Said it would be, "Hello, Goodbye."  
But oh, you came through  
Now they're eating humble pie

They all said we'd never get together  
Darling, let's take a bow  
For ho, ho, ho!  
Who's got the last laugh?  
Hee, hee, hee!  
Let's at the past, laugh  
Ha, ha, ha!  
Who's got the last laugh now?

**THEY ALL LAUGHED**

By: GEORGE GERSHWIN, and IRA GERSHWIN

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## ON THE ACCURACY OF SOME PAST AND PRESENT FORECASTS

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