trade barriers, but it loses its own opportunity to export and thus becomes less competitive in world markets. Through supply and price management programs, we have tried to protect ourselves from competition and have changed from the primary supplier to the residual supplier of grain for the world. An aggressive, cost-competitive stance on the part of the United States would disable foreign subsidy programs and trade barriers. The resulting competition would improve the efficiency and quality of international agriculture, to the benefit of the world's consumers.

Piazza suggests that comparisons of U.S. agriculture with private firms facing international competition are not useful for understanding global agricultural competition. It seems to me that several general business principles established by the experience of private firms are useful in analyzing our problems and identifying appropriate strategies. For example, business people recognize that the basis of competition for commodity producers, both agricultural and nonagricultural, is the cost of production. They know that neither diversification nor vertical integration are effective competitive strategies if the additional enterprises are too small to be efficient.

It is hard to imagine a vice-president for research in a major manufacturing firm standing up at the monthly board meeting and saying, "We should stop improving our production technology because we're contributing to overcapacity in the industry." Equivalent statements are heard frequently, however, with regard to production agriculture. Business people know the difference between production and productivity. They know that a manufacturing firm cannot sustain asset values if the assets become less productive.

Business people know that average profit in a mature industry trends toward zero, which means that artificially high prices are associated with artificially high costs. When programs supporting artificially high prices are withdrawn, the artificially high costs will adjust more slowly, squeezing the industry and hastening the demise of participants with less than average (less than zero) profits. Whatever uniqueness U.S. production agriculture enjoyed as an industry is disappearing rapidly (*3*), which is probably for the best. We should view it now as a very large, very important, hi-tech manufacturing industry that can both learn from and instruct other industries.

I agree with Reynolds that we should not argue the relative merits of basic and applied research. They cannot be ranked or prioritized, anymore than one can prioritize the links in a chain. However, we definitely should distinguish between basic and applied research, not to say that one is better than the other but to recognize that they differ in important ways. They play different roles, serve different clientele, address phenomena with different scales of time and motion, require different training and experience, are supported differently, should be organized and managed differently, and need to be evaluated using different criteria.

Reynolds suggests that competitive grants should be directed to both basic and applied research. This provides a good example of why it is important to distinguish between them. The question is not whether researchers should compete for resources, but at what level the priorities for research funding should be set and allocations determined. Competition at the national level is not practical for adaptive research because of its site- and situation-specificity. If researchers from Iowa and Illinois presented proposals for similar adaptive research efforts, it would make no sense to rate one over the other, even if one were technically superior, because it is essential that the research be conducted in both environments.

Even at the regional and state levels, funds for adaptive research must be directed to programs that provide necessary information along a broad front. Allocation procedures must address economic, social, environmental, and even political concerns of locales, states, and regions, as well as scientific validity and investigator competence. Agricultural administrators in state institutions and USDA have effectively balanced these concerns, but are experiencing difficulties because of a general lack of appreciation for the nature and importance of publicly supported, applied agricultural research. Hanson shares my concern that this lack of appreciation has been translated into reduced program support at the very time when increased investment in adaptive research would yield such a high return.

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The Federal Deficit

Back in the simpler days of World War II, a Bill Mauldin cartoon showed Army brass on a mountain road looking out on a glorious vista. The caption read, more or less, "And is there a view for the enlisted men?" Reading Robert Eisner's article "The federal deficit: How does it matter?" (25 Sept., p. 1577), I wondered, "And is there an economics for the middle class and the poor?" It is cheery to read, "we owe the debt essentially to ourselves," but in fact it is *all* of us who owe some 88% of the debt essentially to the *few* of us who hold most of the treasury bills, notes, and other negotiable government paper. As time, deficits, debts, and interest payments go on, *some* of us get richer and richer while *most* of us get poorer and poorer. Since most readers of *Science* are of the disappearing middle class, some will eventually get richer, but most will get poorer.

It is only common sense to invest one's capital in areas of high yield and to do the same with excess discretionary income. People of means will not support science unless the probable payoff exceeds that of other investments. The federal administration will only invest—enthusiastically—in projects which will enhance the image of national power. But who is empowered to be concerned with long-range planning for effective use of resources for human benefit? We evidently cannot look to government, nor can we look to the economics of wealth and power. Can we look to any science?

Presumably there should be a science of governance (not cybernetics!) and politics not dependent on a particular government or party. It should be a science for all the people.

I practice psychiatry, and most of my patients are rich. Yet I have also treated the poor, and F. Scott Fitzgerald is dead wrong: the rich are not different. They suffer from illogic and irrationality and emotional flooding just like everyone else. There is only one psychology, as there is one physics, one mathematics and, I hope, only one economics. But perhaps not yet.

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It may be presumptious for a physical scientist to argue with an economist about economic issues. However, I have to question the validity of a key assertion in Eisner's article, namely, that "federal deficits add to government liabilities that are assets—in the form of treasury bonds, notes, bills, and money—of the private sector (and of state and local governments). Paradoxical as it may seem, and contradicting the equivalence theorem, federal deficits thus make private individuals and businesses wealthier."

Surely, a government obligation does not

appear in an investor's portfolio by the wave of a magic wand. Such an investment represents the allocation of existing funds to a particular asset—funds that could be directed into other (possibly more productive) endeavors.

Coverage of the deficit by printing money may indeed make households *feel* wealthier, as Eisner goes on to state it. It may, in fact, make *some* households wealthier; but it does so by redistribution, not by increasing the total wealth within the system. Furthermore, most of the redistribution represents the transfer of wealth from the private to the federal sector; that is, it is a hidden tax.

The thrust of the proposition appears to be an attempt to disprove the First Law of Economics and establish that there is such a thing as a free lunch. Unfortunately, it does not succeed.

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An important part of Eisner's analysis is the adjustment of various statistics for inflation. It would be interesting to also determine the impact of deficits on the causes of inflation. The reason that his remedy, increasing the money supply, lowering interest rates, and lowering the dollar relative to other currencies, is not embraced by 100% of our population is the fear of inflation. Then again, which is cause and which is effect? Right now, the increase in the trade deficit has caused investors to sell their debt instruments, which has raised interest rates by 3% so far since April. Presumably, if the trade deficit decreased, this would cause interest rates to decrease. Is vice versa also true?

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Response: Rashkis has a point in suggesting that running a federal budget deficit, and thus increasing the federal debt and treasury interest payments, may have an impact on income distribution. It is not clear though that this impact, compared with what would happen if we eliminated the deficit, either by raising taxes or cutting government expenditures, is injurious to "the middle class and the poor."

For, in fact, some 18% of the current $2400-billion debt is held by U.S. government agencies and trust funds, including the social security funds. Another 10% is held by the federal reserve, which pays its profits right back into the treasury. And the distribution of the rest among banks, insurance companies, state and local governments, and individuals, particularly in their pension funds, is such that it is not at all clear that the ultimate beneficiaries are particularly less "middle class" than those who pay the taxes. And if eliminating the deficit means spending less for education, health, social security, and public investment of all kinds, it is likely that the poor and all of the rest of us will be worse off. Of course, if the deficit, let alone the debt, could be reduced by eliminating expenditures that many of us find wasteful if not damaging—Star Wars, perhaps?—the middle classes and many more might find themselves better off.

Sutton is right that deficits which are too large *can* cause inflation. Deficits imposed on an economy with substantial slack capacity and unemployment do not, in fact, do so. It must be observed that while deficits soared from 1982 on, inflation and nominal interest rates both declined sharply. Easier money, lower interest rates, and a lower dollar are all the more indicated now with the stock market's Black Monday and its aftermath. The current danger is recession, not inflation.

Menkart's observation that an individual does not become wealthier by the act of buying a government bond is entirely correct, but his inference from this that increases in government debt do not increase the assets of the private sector illustrates the fallacy of composition. What is true for one individual is not in this case true for all. For if the government runs no deficit, one individual must buy treasury securities from another. One person then gives up money for a treasury bill or bond and another gives up his treasury security for the money. But if the government is running a deficit, that means it is getting money from one individual by selling a security and then giving that money to some other individual as it carries out its deficit spending. Thus, the total amount of money held by the public is unchanged, but the total of federal debt held by the public is increased by the amount of the deficit. Of course, whether this increase in private sector wealth in the form of government securities results in more real wealth, public and private, in the entire economy, is another matter on which I hope my article offered some illumination. In general, total real wealth is likely to be increased by deficits in economies with significant unemployment and unutilized resources. And that, by the way, entails profound effects on the distribution of income as well as its aggregate.

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Facial Recognition Cells and Autism

The report "Cells in temporal cortex of conscious sheep can respond preferentially to the sight of faces" by K. M. Kendrick and B. A. Baldwin (24 Apr., p. 448) is relevant to an understanding of the neurological defect in infantile autism because it provides evidence that there is a distinct area along the fundus of the superior temporal sulcus in the brains of sheep related to facial recognition. A similar area exists in monkeys (*1–4*). This area receives inputs from the inferior temporal cortex, which is related to visual data processing (*2, 3*) and sends outputs to the amygdala, which has neurones responsive to faces (*2*). The amygdala has been called the "sensory gateway to the emotions" (*5*) because it receives converging inputs from a variety of cortical processing areas involving all sensory modalities.

The adult human ability to interpret emotion, achieved through facial expression, gestures, and nonlinguistic aspects of speech such as melody, pauses, intonations, stresses, and accents, is disrupted by brain lesions in the right posterior temporal and posterior parietal opercula (*6*). This area is analagous to Wernicke's area in the left hemisphere, damage to which produces sensory aphasia (*6, 7*). Desimone *et al.* (*4*) place the facial recognition area of monkeys within the area of the cortex in man devoted to supramodal language, that is, Wernicke's area.

If this area or its subcortical connections, such as the amydgala, is disrupted in the right hemisphere, with or without damage to the analagous area in the left hemisphere, early in life, particularly before language is well established, then a serious disorder of socialization and of language learning would probably result. A person with such a disorder would experience the essential elements of infantile autism (pervasive developmental disorder): serious difficulty in interpreting and forming social relationships (*8–10*) as well as major problems in comprehending language (*9–11*).

Many of the nonessential, but commonly associated, features of autism, such as mental retardation and seizures, can be accounted for by damage extending outside this area.

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