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NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

SPRING 1986

Program Report

Productivity and Technical Change*

Zvi Griliches

Productivity is one of the major sources of long-term economic growth. Since the recent growth performance of the U.S. economy has been rather poor, interest has increased in understanding productivity growth and its determinants.

In the long run, productivity growth is a function of the accumulation of physical and human capital and of the growth in the base of technical knowledge used in employing resources. The technological base in turn is produced, at least in part, by formal investments in industrial R and D and by public and private expenditures on science at universities and laboratories in the United States and abroad.

In spite of the great expansion of economic measurement and data bases in recent decades, we are still rather far from having the kind of data that would allow us to analyze clearly what is happening to productivity growth and to understand its determinants well. There are two major problems here. First, we have great difficulty accurately measuring the prices of rapidly changing, complex, new goods and types of industrial equipment. Hence we are not sure about our measurement of "real" output and productivity. Second, our measurement framework for productivity, that is, the "weights" that we assign to different inputs in accounting for the observed changes in output, depends very much on assuming reasonable foresight and no major errors in the choice of resource levels; and, on the ability of these resources to adjust relatively quickly to changing cir-

*For earlier reports on the activity of this program, see the Spring 1983 and Summer 1985 issues of the NBER Reporter, and R and D, Patents, and Productivity, Z. Griliches, ed., Chicago: University of Chicago Press, 1984.

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This issue of the *Reporter* highlights the Bureau's Program in Productivity and Technical Change. Next, Joshua Aizenman describes his work on economic structure, wage indexation, and monetary policy in the open economy. Then, Robert J. Hodrick discusses risk premiums in foreign exchange markets. After the quarterly Economic Outlook Survey are biographical sketches, news of NBER conferences, the Conference Calendar, and other NBER news and reports. The *Reporter* concludes with short summaries of recent NBER Working Papers.

cumstances. In fact, however, mistakes are made: resources are invested in the wrong place at the wrong time; machinery becomes obsolete before its time; and both labor and capital may be underemployed because of mistaken notions about future growth in domestic and foreign demand. This introduces the possibility that resultant contributions of different resources to output growth are not measured correctly when either base or end period prices are used to evaluate such growth.

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This background, in part, explains the two major areas of research of NBER's Program in Productivity and Technical Change. The first range of topics deals with the role of R and D expenditures and the analysis of their determinants. In various studies, we have tried to compute the rate of return to R and D, evaluate the importance of spillovers of research results from one firm and industry to another, and investigate the use of patent data as a proxy for the missing measurement of research "output."

Our second focus is on the measurement of capital and its contribution to productivity growth. We are especially interested in changes in capacity utilization, the impact of unanticipated changes in energy prices on capital utilization, and the measurement of its contribution to productivity. Currently, a number of Bureau researchers, including Ernst R. Berndt, Michael Denny, W. Erwin Diewert, Melvyn A. Fuss, Charles Hulten, and Catherine G. Morrison are pursuing this range of topics and will report on them in subsequent issues of the *NBER Reporter*.

Since M. Ishaq Nadiri reported on our work on R and D as an investment and on the measurement of returns to R and D in the Summer 1985 *NBER Reporter*, it will not be discussed further here. Instead, I will review our comparative studies of productivity growth at the firm level, the work on the measurement of R and D spillover effects across different firms and industries, and estimates of the value and depreciation of patent rights.

I used a new data set (the NSF-Census match) on the largest 1000 manufacturing firms in the United States during 1957-77 to investigate the relationship between R and D and productivity growth. Using a standard production framework augmented by additional R and D "capital" and "mix" variables (the fraction basic and the fraction privately financed), I find that R and D contributed to productivity growth in the 1970s, with no significant decline in its effectiveness as compared to the 1960s. The basic research component contributed more strongly than the privately financed component, and privately financed R and D expenditures had a larger effect on private productivity and profitability than federally financed expenditures. While these findings are subject to a number of reservations, they do suggest that the slowdown in the growth of R and D and the absolute decline in basic research that occurred in industry in the 1970s may turn out to be very costly to the economy in the future, in terms of forgone growth opportunities.¹

Jacques Mairesse and I used a similar data set, constructed at the NBER, to extend our earlier work on the productivity growth of manufacturing firms in France and the United States to an analysis and comparison

¹Z. Griliches, "Productivity, R and D, and Basic Research at the Firm Level in the 1970s," *NBER Working Paper No. 1547, January 1985*, and *American Economic Review (February 1986)*.

of parallel data on Japanese firms.² We find that Japanese firms doing R and D spend about as much, relative to their sales, as do similar U.S. firms and appear to receive rather similar returns from such expenditures. Thus there are no clear differences in either the intensity of R and D investments or in their fecundity in the two countries. Hence R and D expenditures per se cannot account for the rather large difference in the observed rates of productivity growth between the two countries.

Two puzzling facts do account for a significant fraction of the difference in Japanese and U.S. rates of growth: (1) In spite of their otherwise successful growth record, Japanese firms were reducing their labor force on average during this period (1972-80) while U.S. firms were increasing the number of their employees. (2) It appears that investment in physical capital contributed more to growth in Japan than in the United States, since its estimated coefficient is about twice the size of the U.S. coefficient.

Another major thrust of Bureau studies in this area has been the use of patent statistics in trying to understand the R and D process and its contribution to economic growth. To study this topic, we created a data set that combines output, employment, investment, market value, R and D, and other data for most of the publicly traded U.S. manufacturing companies with information on the type and number of patents received by these corporations.³ Bronwyn H. Hall, Jerry A. Hausman, and I used these data to investigate the lag structure between R and D expenditures and subsequent patent applications by these firms.⁴ Using rather advanced econometric techniques, we were unable to discover much more than a strong contemporaneous relationship between R and D and patenting. There was a hint that history also matters and that the contribution of presample R and D could be large, but it was difficult to distinguish this from permanent differences in the propensity to patent across firms.

An interesting fact that emerged from this study is that the R and D behavior of these manufacturing firms can be characterized as a random walk with a relatively small error variance. That is, R and D budgets were roughly constant, or growing only slightly and randomly (in constant dollars), during the relatively short period we examined (eight years), making it difficult to estimate a complex and long lag structure, even if it

were truly present. These findings could also be interpreted as implying the possibility of some reverse causality: successful research may lead both to patent applications and to a commitment of additional funds for development since development, rather than basic or applied research, accounts for well over 50 percent of the reported R and D expenditures.

In an effort to identify the paths and patterns of technological spillovers across firms, Adam B. Jaffe used the information on patterns of patenting (in different patent classes) by these same firms to construct a measure of their position in "technological space" and the closeness between them.⁵ He modeled spillovers of R and D by examining whether the R and D of neighboring firms in technological space has an observable impact on a firm's success. He found that firms whose neighbors do a lot of R and D produce more patents per dollar of their own R and D and have higher rates of productivity growth. In terms of profit, or market value, however, there are both positive and negative effects of nearby firms' R and D. The net effect is positive for high R and D firms, but firms with R and D about one standard deviation below the mean are made worse off overall by the R and D of others.

The search for spillover effects was also the motivation for my analysis, with Frank R. Lichtenberg, of productivity growth at the industry level.⁶ We used measures developed at the NBER of total factor productivity growth for 193 U.S. manufacturing industries (at the three- and four-digit SIC level) for 1963-78. With data on R and D developed by F. M. Scherer, we investigated the question of whether the R and D embodied in purchases from other industries contributes to productivity growth in the "user" industry. We found that "own-process" R and D is a stronger contributor to productivity growth than "own-product" R and D, perhaps because of difficulties in measuring real output correctly for industries in which new products are important. However, the contribution of "imported" R and D, while positive, was not very statistically significant or stable over time. The spillover effect appears to be there, but it is likely to be more important for some industries than others and an "across-the-board" regression may not be the right tool for detecting it.

Another issue related to spillovers is the impact of federally financed R and D expenditures on the rate of private expenditures on R and D. In a recent paper, Lichtenberg shows that what looks like a stimulative effect of federal R and D on private R and D is mislead-

²Z. Griliches and J. Mairesse, "R and D and Productivity Growth: Comparing Japanese and U.S. Manufacturing Firms," NBER Working Paper No. 1778, December 1985.

³C. Cummins, B. H. Hall, E. S. Laderman, and J. Mundy, "The R and D Master File: Documentation," Cambridge, MA: Harvard University (September 1985), unpublished, describes and documents these data.

⁴B. H. Hall, Z. Griliches, and J. A. Hausman, "Patents and R and D: Searching for a Lag Structure," NBER Working Paper No. 1227, November 1983, and *International Economic Review*, forthcoming.

⁵A. B. Jaffe, "The Effects of Market Demand, Technological Opportunity, and Research Spillovers on R and D Intensity and Productivity Growth," NBER Working Paper No. 1432, August 1984.

⁶Z. Griliches and F. R. Lichtenberg, "Interindustry Technology Flows and Productivity Growth: A Reexamination," NBER Reprint No. 542, November 1984, and *Review of Economics and Statistics* 66, 2 (May 1984), pp. 324-329.

ing.⁷ First, a significant fraction of private R and D expenditures is devoted to defense-related topics and is an investment in garnering future government contracts. Second, the stimulative effect comes primarily from the fluctuations in the overall rate of federal procurements rather than specifically from its R and D component.

Ariel Pakes and Mark A. Schankerman have used data on patent renewals and renewal fees in several European countries to estimate the private value of patent rights and their dispersion and decay over time.⁸ Besides presenting several interesting methodological innovations, these papers reach a number of substantive empirical conclusions: for example, the average value of patent rights is quite small, about \$7000 in the population of patent applications in France and the United Kingdom. In Germany, where only about 35 percent of all patent applications are granted (about 93 and 83 percent were granted in France and the United Kingdom, respectively), the average value of a patent right among grants was about \$17,000. The distribution of these values, however, is very dispersed and skewed. One percent of patent applications in France and the United Kingdom had values in excess of \$70,000, while in Germany 1 percent of patents granted had values in excess of \$120,000. Moreover, half of all the estimated value of patent rights accrues to between 5 and 10 percent of all the patents. The annual returns to patent protection decay rather quickly over time, with a rate of obsolescence on the order of 10 to 20 percent per year. Since about 35,000 patents were applied for per year in France and the United Kingdom and about 60,000 in Germany, these figures imply that the aggregate value of patent rights is quite large. However, it is only 5 to 10 percent of total national expenditures on R and D and therefore other means of appropriating the benefits of the investments in R and D must be quite important.

While the total number of patent applications fell during the 1970s, one should not take this decline in numbers as implying, necessarily, the exhaustion of technological opportunities. Schankerman and Pakes find that although the number of patents per scientist and engineer fell sharply, their estimated "quality" (that is, the total value of patent rights per scientist and engineer) was remarkably stable over the period examined by them. They also show how data on the renewal status of patents can be used to reduce the error variance when patents are used as indicators of the value of inventive output, but their finding of extreme skew-

ness in the distribution of patent right values has rather pessimistic implications for other areas of this research program that use patent counts as indicators of changes in R and D output. Since renewal fees on outstanding patents have also been imposed recently in the United States, we should be able to test their model and provide similar estimates in the near future for the U.S. patent system.

There are a number of other research strands in the program; I can mention them only briefly. Robert J. Gordon is revising his manuscript on the measurement of durable equipment prices in the United States. This may have far-reaching implications for the measurement of capital accumulation in the postwar period and for associated measures of productivity. Lichtenberg and I are investigating errors of measurement in the Producer Price Index using Census unit values as another, erroneous indicator of true price change. Hausman and I have also been developing more general methods for the analysis of panel data with random measurement errors.⁹ Richard Ericson and Pakes are studying the growth of small, R and D-intensive firms; Hall is studying the growth of manufacturing firms in the United States during the 1970s, with special emphasis on their mortality and its relationship to their R and D effort, if any; and Sumanth Addanki is pursuing a similar analysis of mergers in our Compustat-based data set. Thomas Abbott, Mairesse, and I are looking at the heterogeneity of individual firm behavior, trying to understand the sources of the large dispersion in the relationship between capital accumulation and output growth at the micro level. Abbott, Hausman, and I are also trying to use the Census Longitudinal Establishment Data file of individual plant data to study the response of productivity to changes in energy prices.

The Program in Productivity has held a number of conferences and Summer Institute meetings that also included a wider circle of researchers. A conference on "Quantitative Studies of R and D in Industry" was held in Paris in September 1983, organized jointly by the NBER, the Centre Nationale de la Recherche Scientifique, and the Institut National de la Statistique et des Etudes Economiques. Two miniconferences, organized by Nadiri, on the "Economics of Spillovers" were held in Cambridge in 1984 and 1985, in conjunction with the Summer Institute. Also, a number of periodic program meetings were held; the last one was March 14 in Cambridge.

During 1985, the program was expanded by the inclusion of new members: Timothy Bresnahan and Peter Reiss from Stanford University, Fumio Hayashi from Osaka University, Richard Levin from Yale University, and Robert Sickles from Rice University. Their work undoubtedly will feature prominently in our next progress report.

⁷F. R. Lichtenberg, "Assessing the Impact of Federal Industrial R and D Expenditure on Private R and D Activity," prepared for presentation at the National Academy of Sciences Engineering Workshop, "The Federal Role in R and D," Washington, DC, November 21-22, 1985.

⁸A. Pakes, "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," NBER Working Paper No. 1340, April 1984, and M. A. Schankerman and A. Pakes, "Estimates of the Value of Patent Rights in European Countries during the Post-1950 Period," NBER Working Paper No. 1650, June 1985.

⁹Z. Griliches and J. A. Hausman, "Errors in Variables in Panel Data," NBER Technical Working Paper No. 37, May 1984, and *Journal of Econometrics*, forthcoming.

Economic Structure, Wage Indexation, and Monetary Policy in the Open Economy

Joshua Aizenman

Designing policies that facilitate adjustment to macroeconomic shocks has been an important topic in the literature of open macroeconomics. In the 1960s and the 1970s, nominal shocks and inflation were the focus of attention. In the late 1970s and early 1980s, real shocks associated with the sharp changes in the price of oil shifted the emphasis to the appropriate adjustment to supply shocks. When an economy faces both real and nominal shocks, optimal policy to enhance economic adjustment needs to deal both with adjustment of wages and with adjustment of the money supply. While monetary policy cannot eliminate real shocks, specific monetary rules may prevent real and nominal shocks from creating additional welfare costs in the presence of nominal wage contracts. In several related papers, I investigate a framework for addressing these issues. My research in this area has benefited from continuous collaboration with NBER Research Associate Jacob A. Frenkel.

Wage Indexation, Monetary and Exchange Rate Policies

Establishment of a well-defined welfare criterion is essential to the analysis of the topics just mentioned. One develops such a criterion by formulating an economy characterized by short-run nominal contracts that reflect the cost of wage negotiation.¹ When stochastic shocks occur, this situation introduces a distortion into the labor market. The welfare implications of any given policy are expressed in terms of the resul-

¹Previous research by S. Fischer, "Long-Term Contracts, Rational Expectations, and the Optimal Money Supply Rule," *Journal of Political Economy* (1977), and J. A. Gray, "Wage Indexation: A Macroeconomic Approach," *Journal of Monetary Economics* (1976), describes policies that minimize output deviations from the flexible ("frictionless") level of output. My research explores the welfare foundation of such a criterion in terms of the supply-demand conditions in the labor market.

tant expected dead-weight loss in the labor market.² The existence of asymmetric information in an economy with nominal wage contracts has implications for the limitations of macro policies. In such an economy, we should distinguish between the dead-weight loss that is caused by preset nominal wages and the dead-weight loss that is induced by a missing auction labor market.³ A missing auction labor market reduces the information content of prices, thereby decreasing the information available to economic agents. My research shows that optimal macroeconomic policies can eliminate the welfare loss caused by preset wages, but not the welfare loss caused by a missing auction market.

Armed with the welfare criterion, we compute the optimal degree of wage adjustment needed to accommodate shocks and to explore the implied linkages among optimal wage indexation, monetary intervention, and exchange rate intervention.⁴ We also analyze the welfare ranking of second-best policies that are applicable for economies that are constrained from using first-best policies. In this context, we show that the ranking of exchange rate regimes depends on the menu of available policy instruments. In the absence of indexation, floating rates become more desirable as the volatility of foreign prices and real shocks increases; under floating rates, the exchange rate adjustment mitigates the effect of these shocks.⁵ The relative desirability of a fixed exchange rate increases with the volatility of monetary shocks and of foreign interest rates because fixed exchange rates isolate domestic output from the volatility of these shocks.

Openness and Macroeconomic Policies

Openness is a key parameter, reflecting the degree of integration of the economy with other nations. My research evaluates the implications of various measures of the openness of an economy for the design of policies. I conclude that the benefits obtained from the use of relative prices, in addition to aggregate prices,

²This criterion is described in J. Aizenman, "Wage Contracts with Incomplete and Costly Information," NBER Working Paper No. 1150, June 1983, and is formally derived in J. Aizenman and J. A. Frenkel, "Supply Shocks, Wage Indexation, and Monetary Policy," NBER Working Paper No. 1609, April 1985, and "Optimal Wage Indexation, Foreign Exchange Intervention, and Monetary Policy," NBER Reprint No. 637, September 1985, and *American Economic Review* 75, 3 (June 1985), pp. 402-423.

³J. Aizenman, "Stabilization Policies and the Information Content of Real Wages," NBER Working Paper No. 1373, June 1984, and *Economica* (1986).

⁴J. Aizenman and J. A. Frenkel, "Optimal Wage Indexation, . . ."

⁵J. Aizenman, "Optimal Wage Renegotiation in a Closed and Open Economy," NBER Reprint No. 548, November 1984, and *Journal of Monetary Economics* 13 (1984), pp. 251-262.

as indicators for macroeconomic policies increase with the degree of openness of the economy.⁶ The responsiveness of optimal policies to relative prices also increases with the degree of openness. In an economy with flexible exchange rates, openness is associated with a lower degree of wage flexibility.⁷

Openness raises the issue of optimal sectorial wage-adjustment rules. In order to focus on intersectorial wage structure without abandoning the competitive neoclassical paradigm, it is useful to study an economy in which workers differ from each other in their absolute and relative skills. Such differences result in equilibrium sectorial wage differentials that are affected by real shocks. Optimal wage-adjustment rules alter both the absolute and the relative structure of sectorial nominal wages, and the rules depend on both the degree to which the economy is open to international trade and the degree of heterogeneity of the skill distribution.⁸

Supply Shocks, Monetary Accommodation, and Wage Indexation

Frenkel and I have studied the design of wage policy and monetary policy in the presence of supply shocks.⁹ We derive the welfare ranking of various rules for wage indexation and the welfare ranking of alternative rules for monetary policies. We consider certain targeting rules for monetary policy including nominal income targeting and CPI and GDP price deflator targets. If the elasticity of the demand for labor exceeds the elasticity of its supply, we find that welfare is higher if monetary policy targets nominal income rather than the GDP deflator, and higher with the GDP deflator than with the CPI. Likewise, under these circumstances, welfare is higher when wages are indexed to nominal income rather than to the GDP deflator and higher when wages are tied to the GDP deflator rather than to the CPI. The relative welfare gains of the various targeting rules for monetary policy and indexing rules for wages are reversed if the elasticity of the labor demand falls short of the elasticity of labor supply.

The same paper also considers the conditions under which the accommodative monetary policy can facilitate adjustment to supply shocks. We show that a greater interest elasticity of demand for money, a higher

degree of wage indexation, a lower elasticity of labor supply, and a lower income elasticity of the demand for money all increase the likelihood that optimal monetary policy should accommodate supply shocks.

Deviations from Purchasing Power Parity (PPP)

Specification of the linkage among national price levels is central to most models of international economics. This linkage is usually formulated by the PPP relationship, which states that the domestic price level is linked to the foreign price level adjusted for the exchange rate. The extent to which PPP holds has important implications for the nature of the international transmission of policies and shocks, as well as for the determination of the desired currency composition of financial portfolios. Although theoretical models have used the PPP relationship intensively, empirical studies have shown frequent and persistent deviations from PPP. My research attempts to explain the forces that shape these deviations.

Deviations from PPP can be explained by the cost of goods arbitrage and gradual price adjustment. Consider the case in which costs of arbitrage are substantially higher in goods markets than in financial markets. Combining two distinct models (preset and flexible price models) into a unified framework allows us to trace forces that explain deviations from PPP.¹⁰ The analysis establishes the link between the volatility of the shocks that affect the economy (relative to costs of price adjustment and transportation costs) and deviations from PPP. I extend the analytical framework to allow for an evaluation of the welfare implications of greater price flexibility and the role of wage indexation, as well as to explore the dependency of deviations from PPP on the exchange rate regime. This model has implications for empirical tests of PPP. In a related study, I show that the volatility of the shocks affects the regression coefficients obtained in empirical studies of PPP. Specifically, the estimated regression coefficients are subject to a bias that depends on the volatility of the shocks, normalized by costs of goods arbitrage.¹¹

The framework just described explains transitory deviations from PPP. However, observable deviations from PPP are highly autocorrelated. In order to explain persistent cycles of deviations from PPP, I studied deviations from PPP for an economy in which the organization of industry is characterized by producers

⁶J. Aizenman, "Openness, Relative Prices, and Macro Policies," *NBER Reprint No. 635, September 1985*, and *Journal of International Money and Finance* 4, 1 (September 1985), pp. 5-17.

⁷J. Aizenman, "Wage Flexibility and Openness," *NBER Working Paper No. 1108, April 1983*, and *Quarterly Journal of Economics* (1985).

⁸J. Aizenman and J. A. Frenkel, "Sectorial Wages and the Real Exchange Rate," *NBER Working Paper No. 1801, January 1986*.

⁹J. Aizenman and J. A. Frenkel, "Supply Shocks, Wage Indexation, and Monetary Accommodation," *NBER Working Paper No. 1609, April 1985*.

¹⁰J. Aizenman, "Modeling Deviations from Purchasing Power Parity (PPP)," *NBER Reprint No. 509, August 1984*, and *International Economic Review* 25, 1 (February 1984), pp. 175-191.

¹¹J. Aizenman, "Testing Deviations from Purchasing Power Parity (PPP)," *NBER Working Paper No. 1475, October 1984*, and *Journal of International Money and Finance*, forthcoming.

with limited market power.¹² Price changes are assumed to be costly and to be made in an unsynchronized manner. I derive the optimal degree of price path staggering and evaluate the role that substitutability between domestic and foreign goods plays in explaining observable deviations from PPP and in determining the output effects of monetary policy. The model generates deviations from PPP with a persistency similar to that observed in the data. The analysis also identifies the factors that determine long-run relative prices, showing that a smaller degree of substitutability between domestic and foreign goods and a higher share of labor are associated with longer deviations from PPP. A greater degree of substitutability also raises the magnitude, but reduces the duration, of the output shocks resulting from a given monetary innovation.

This research is a step toward the integration of models of monopolistic competition (which have been studied intensively in the "real" side of international trade) with international macroeconomics.¹³ Economists frequently have made implicit assumptions about the presence of monopolistic competition, but the critical importance of limited goods substitutability has not been explored sufficiently.

¹²J. Aizenman, "Monopolistic Competition, Relative Prices, and Output Adjustment in the Open Economy," NBER Working Paper No. 1787, January 1986.

¹³Monopolistic competition in macro models is also under study by R. Dornbusch and A. Giovannini. And D. A. Dixit, E. Helpman, and P. R. Krugman have studied monopolistic competition in the context of trade models.

Risk Premiums in Foreign Exchange Markets

Robert J. Hodrick

The academic community, policymakers, and corporations all are interested in how well the system of flexible exchange rates is working. One aspect of this question is whether forward and futures markets for foreign exchange are functioning well. In particular, what does efficiency mean in these markets? The answer to this question requires a description of the equilibrium expected rates of return demanded by investors. I have examined that equilibrium in several empirical research projects. My results provide some evidence that can be used to address the questions posed above, and the broader issue of how any equilibrium asset price is determined.

I was originally motivated to study the forward foreign exchange market because of my interest in modeling spot exchange rates. Many simple rational expectations models of spot exchange rates assume that the forward exchange rate is an unbiased expectation of the future spot exchange rate and that the expectation is based on all available information in the market. These assumptions often are used when economists investigate the effects on exchange rates of sterilized or unsterilized intervention by central banks. They are also used in analyses of whether foreign exchange rates are characterized by bubbles that would tend to make actual rates different from the rates required by market fundamentals. Since modern financial theory predicts that an unbiased forward rate is only a special case of forward market efficiency, are these assumptions correct?

Much early empirical work on the efficiency of the stock market assumed a constant expected rate of return as its characterization of an efficient market. In contrast, modern financial theories allow for considerable variation in expected rates of return. If efficient financial markets had constant expected rates of return, then efficiency of the forward exchange market would require the forward rate either to be an unbiased predictor of the future spot exchange rate or to possess a constant bias. The bias would be attributable to an equilibrium risk premium arising as compensation to traders for bearing risk.

In two papers, Lars Peter Hansen and I investigated the proposition that forward rates are unbiased predictors of future spot rates.¹ We rejected that proposition because we could use information, available to investors at the time that the forward contract was signed, to explain the prediction error of the forward rate. The statistical significance of this rejection has been questioned by some who doubt the validity of the inference that is based on large sample techniques. If our rejection of unbiasedness is valid, the data indicate either that the forward market is inefficient or that efficiency in the forward market requires a model of time-varying expected returns.

To determine whether time-varying expected returns on forward contracts are the primary reason to reject the unbiasedness hypothesis, Hansen and I developed a model that allowed for movement in expected returns. We modified existing intertemporal asset pricing models to create pricing models of forward contracts for trading monies. Hansen and I chose not to test the implications of the model directly, for three reasons. First, formal tests of the model require specification of a utility function, and there is considerable debate about what

¹L. P. Hansen and R. J. Hodrick, "Forward Exchange Rates as Optimal Predictors of Future Spot Rates: An Econometric Analysis," *Journal of Political Economy* (October 1980), and "Risk Averse Speculation in the Forward Foreign Exchange Market: An Econometric Analysis of Linear Models," in *Exchange Rates and International Macroeconomics*, J. A. Frenkel, ed., Chicago: University of Chicago Press, 1983.

factors enter such a function. Second, direct tests require observations on consumption bundles and price indexes that are inaccurately measured with monthly data. Third, direct tests require specification of the complete economic environment that produces the observed series as an equilibrium.

Instead of testing the model directly, we developed an econometric model that captures the spirit of the formal economic model. Our econometric model required that the normalized expected profits on the forward contracts for several currencies be proportional to an unobservable expected return on a benchmark portfolio. We normalized the profits on the forward contracts by dividing them by the current spot rate to produce stationary time series. In contrast to the theory, the econometric specification assumed that the factors of proportionality are constant but, consistent with the theory, the expected return on the benchmark portfolio is allowed to move through time. This model placed strong cross-equation restrictions on the coefficients of the information used to predict the profits on the forward contracts. The same set of information was used for each currency, and the restrictions required proportionality of the coefficient vectors across the various currencies used in the study. Estimation of the model also required some econometric innovations because, as in our previous work, we were allowing for a forecast interval in the forward contract that was greater than the sampling interval of the data.²

Since we could not reject the proportionality restrictions of the model, Hansen and I concluded that time-varying risk premiums were a sensible explanation for rejection of the unbiasedness hypothesis. This conclusion, however, has been overturned by more recent work; Sanjay Srivastava and I used an additional two years of data and rejected the restrictions of the latent variable model just described.³ We also investigated whether the rejection of the restrictions of the Hansen-Hodrick model was caused by the assumption of constant factors of proportionality. Srivastava and I argued that the theory requires only proportionality of the normalized expected profits on forward contracts at each point in time, and not that the factors of proportionality be constant through time. Hence, the theory might be true, but the parameters would not be constant through time. In this case, the reduced-form coefficients of the model ought to be time-varying; evidence that the coefficients were constant would be consistent either with an alternative model of movement in expected returns or with market inefficiency.

²See L. P. Hansen, "Large Sample Properties of Generalized Method of Moments Estimators," *Econometrica* (July 1982), for the formal treatment of the theory underlying the estimation strategy.

³R. J. Hodrick and S. Srivastava, "An Investigation of Risk and Return in Forward Foreign Exchange," NBER Working Paper No. 1180, August 1983, and *Journal of International Money and Finance* (April 1984).

Since the assumption of constant reduced-form coefficients did not seem grossly at variance with the data, we turned our attention to claims that the risk-return trade-off in the forward market was too good to be consistent with market efficiency.

We examined the sequence of expected returns and conditional variances of a trading rule; it used forecasts of expected profits on a set of dollar-denominated forward contracts to form a portfolio of positions in the forward foreign exchange market. The positions in the various currencies were chosen to minimize the variance of the portfolio's profit for a given expected profit. We concluded that the conditional variance of the profit on the portfolio changed quite often and that the consequent risk-return trade-off was quite volatile. Trading a portfolio of forward contracts did not appear to represent an unexploited profit opportunity.

In another paper Srivastava and I examined the covariance between the expected rates of depreciation of the dollar relative to several foreign currencies and the expected profits on trading contracts to sell those currencies in the forward market.⁴ Fama argued that one can always consider the observable forward premium of the dollar relative to the pound, for example, to have two unobservable components: the expected rate of depreciation of the dollar relative to the pound and a time-varying risk premium. The forward premium is the difference between the forward exchange rate and the current spot rate divided by the current spot rate.

Although our techniques differed from Fama's, we confirmed his finding that the covariance of the expected rate of depreciation and the risk premium is negative and larger in absolute value than the variance of the expected rate of depreciation. Since the variance of the forward premium equals the variance of the expected rate of depreciation and the risk premium plus two times their covariance, such a large negative covariance implies that the risk premium is more variable than the expected rate of depreciation.

Srivastava and I investigated whether negative covariance of expected rates of depreciation and risk premiums was consistent with a general equilibrium model proposed by Lucas.⁵ When defined this way, the risk premium is the normalized expected profit from purchasing dollars in the foreign exchange market. Our analysis indicated that expected profits on this transaction decrease when the expected rate of depreciation of the dollar increases relative to the other foreign currencies. We provided an example of an economy in which this is exactly what ought to happen as the deter-

⁴R. J. Hodrick and S. Srivastava, "The Covariation of Risk Premiums and Expected Future Spot Exchange Rates," NBER Working Paper No. 1749, November 1985, and *Journal of International Money and Finance* (March 1986), builds on the analysis of E. Fama, "Forward and Spot Exchange Rates," *Journal of Monetary Economics* (November 1984).

⁵R. E. Lucas, Jr., "Interest Rates and Currency Prices in a Two-Country World," *Journal of Monetary Economics* (November 1982).

minants of the movement in expected rates of depreciation and risk premiums evolve through time. This example, of course, does not prove that this is the reason for the observed correlations in the data, since there are many other predictions of the model that are not formally tested. Nevertheless, the initial consistency of the theory with the data is a first step toward development of more complex tests of the theory.

Srivastava and I used the finding that the variance of the risk premium was larger than the variance of the expected rate of depreciation as motivation for an analysis of the nature of time-varying risk premiums in the daily futures markets for foreign currencies.

Many people like to use Samuelson's model as a description of how futures prices ought to move in an efficient market.⁶ He argued that perfectly anticipated prices fluctuate randomly. He used as an example a sequence of futures prices, all predicting the same maturity day in the future. In his model, the futures price today is an unbiased predictor of the futures price tomorrow. By the law of iterated expectations, this implies that the futures price is an unbiased predictor of the future spot price. Of course, Samuelson developed the analysis in an environment of constant risk premiums. Consequently, his proposition need not hold if risk premiums fluctuate through time.

Srivastava and I realized this. We also knew that even though there is no necessary presumption that forward exchange rates and futures prices of foreign currency ought to be identical, comparing the two prices on days when they can be legitimately compared indicates no statistically significant difference in the prices.⁷ Hence, if forward rates are biased predictors of future spot rates because of time-varying risk premiums, futures prices must also be biased predictors of the following day's futures price. We investigate this hypothesis in some of our recent work.⁸

Use of data on futures prices is complicated by the contractual structure of the market. Daily data are available on several contracts of various maturities, but the number of maturities is typically small. Foreign currency futures contracts on the International Monetary Market of the Chicago Mercantile Exchange typically require delivery on the third Wednesday of March, June, September, and December. Only three or four contracts are traded at a given time. In order to use daily data on

futures prices, we relied on some recent work by Jagannathan.⁹ He developed an argument that allows the use of asymptotic distribution theory even though the sequence of futures prices predicting the same date in the future cannot be considered a stationary stochastic process.

Srivastava and I investigated the hypothesis that today's futures price of foreign currency is an unbiased predictor of tomorrow's futures price. If it is, then traders are not facing an expected profit or an expected loss on a daily trading strategy. We found the hypothesis to be strongly rejected by the data. Although there do appear to be expected profits and losses on daily trading in the futures market, reconciliation of the implied variability of risk premiums on daily futures prices with the variability of the risk premiums in monthly data appears to require that the one-day risk premiums be highly positively serially correlated. This remains an open question.

The studies I have described strongly suggest that market efficiency in the foreign exchange market requires a model of equilibrium expected rates of returns that vary through time. This statement can be applied to asset markets in general; evidence of predictable movement in the expected rates of return on bonds, stocks, and other assets is now accumulating rapidly. Econometric estimation of such models is possible, but we do not currently have a model whose implications are not rejected by the data. Progress in the study of such models is complicated by the fact that all modern time-series econometric methods require assumptions that certain technical conditions be satisfied. An alternative interpretation of the data is that the sample statistics are not consistent estimates of the parameters underlying people's decisions. If people form their demands for currencies partly based on probabilities of events that do not occur in the sample, the sample statistics will generally not be unbiased estimates of the true parameters.

Are the estimated variances of actual rates of return on assets and the estimated covariances of returns and variables describing the fundamentals of the asset pricing theories converging to the values that agents employed when they chose their portfolios?¹⁰ This question poses an agenda for future research. An answer must also be found before we will be able to address questions such as: Are there bubbles in the foreign exchange market? Or, what are the effects of central bank intervention? Or, are asset prices too volatile compared to the volatility of market fundamentals?

⁶P. A. Samuelson, "Proof That Properly Anticipated Prices Fluctuate Randomly," *Industrial Management Review* (Spring 1965).

⁷B. Cornell and M. Reiganum, "Forward and Futures Prices: Evidence from the Foreign Exchange Markets," *Journal of Finance* (December 1981) finds no statistically significant difference between forward and futures prices although differences arise in models such as J. Cox, J. Ingersoll, and S. Ross, "The Relation between Forward Prices and Futures Prices," *Journal of Financial Economics* (December 1981).

⁸R. J. Hodrick and S. Srivastava, "Foreign Currency Futures," NBER Working Paper No. 1743, November 1985.

⁹R. Jagannathan, "An Investigation of Commodity Futures Prices Using the Consumption-Based Intertemporal Capital Asset Pricing Model," *Journal of Finance* (March 1985).

¹⁰J. A. Frankel and K. Froot, "Using Survey Data to Test Some Standard Propositions Regarding Exchange Rate Expectations," NBER Working Paper No. 1672, July 1985, presents evidence that survey data from 1981 to 1985 are more biased than the forward rate. One interpretation of this result is that a five-year sample of data is small. Fifteen years may also be small.

Economic Outlook Survey

First Quarter 1986

Victor Zarnowitz

According to the March survey of 26 professional forecasters taken by NBER and the American Statistical Association, moderate growth in real GNP is predicted for the year ahead. The median forecast calls for total output to rise only 3 percent in 1985-86 and 2.8 percent in 1986:1-1987:1, somewhat below the average long-term trend rate. Nevertheless, that would be a significant improvement over 1985 when the economy gained just 2.2 percent over 1984 and slowed to 0.7 percent in the last quarter (according to the latest revision of the data). The main factors expected to contribute to the rebound from the recent slowdown are: the declines in interest rates, the exchange value of the dollar, and energy prices. In terms of the major expenditure components of GNP, the better performance is expected to come from the relative strength of residential construction, an upturn in inventory investment, and lower trade deficits.

Uncertainties and Probabilities

The exuberance of the stock market presumably reflects widespread expectations of much higher corporate profits and lower real interest rates. It implies that the weakness of important indicators, which show that the economy is likely to linger in a slack state, will soon give way to genuinely good news: reports of greatly increased growth in real GNP, productivity, profitability, and signals of further advances. Unless such news materializes, the market will have overshoot, and stock prices will tumble from their record peak levels. The overall gain from the downward trends in interest rates, the dollar, and oil prices is not in doubt, but the timing of their lagged effects is. Forecasters are especially aware of these uncertainties and others, notably those associated with future federal budget deficits, tax reform

legislation, and monetary policy. Their views on these matters vary, and that helps to explain the dispersion of their forecasts, but the general impact of uncertainty is to temper optimism.

When asked about the probabilities they attach to alternative intervals of percentage change in real GNP for 1985-86, the forecasters responded as follows:

Percentage Change in Real GNP	Percentage of Responses	
	March 1986 Survey	December 1985 Survey
6.0 percent or more	2	2
4.0 to 5.9 percent	19	14
2.0 to 3.9 percent	55	57
0 to 1.9 percent	17	22
Negative	7	5

The new results are not very different from those of the previous survey, but they show some shifts toward the extremes (4 percent + and negative growth) in the reported mean probability distributions, that is, more dispersion.

The probabilities that output will decline average 10, 10, 15, and 21 percent for the four successive quarters 1986:2-1987:1. They are relatively low and represent downward revisions from the corresponding figures in the December 1985 survey.

Most Forecasters Optimistic on Unemployment and Inflation

Fourteen respondents predict that the unemployment rate will decline in the year ahead, eight that it will rise, four that it will be the same in 1987:1 as in 1986:1. The average forecast for 1987:1 is 6.7 percent; the range is 6.0-7.3 percent. Most of these forecasts are revised downward from the last survey.

Inflation, in terms of the GNP implicit price index, will average 3.1 percent in 1985-86 and 3.3 percent in 1986:1-1987:1. The percentage distributions of means of the individual probabilistic forecasts of IPD (implicit price deflator) inflation in 1985-86 show a definite shift to lower figures:

Percentage Change in IPD	Percentage of Responses	
	March 1986 Survey	December 1985 Survey
8.0 percent or more	9	10
6.0 to 7.9 percent	24	34
4.0 to 5.9 percent	53	52
Less than 4.0 percent	14	4

Annual Projections of GNP and Other Economic Indicators, 1986

	1985 Actual	1986 Forecast	Percent Change
			1985 to 1986
1. Gross National Product (\$ billions)	3992.5	4239.8	6.2
2. GNP Implicit Price Deflator (1982 = 100)	111.7	115.2	3.1
3. GNP in Constant Dollars (billions of 1982 dollars)	3573.5	3678.9	3.0
4. Unemployment Rate (percent)	7.2	6.8	-0.4 ¹
5. Corporate Profits After Taxes (\$ billions)	140.6	149.5	6.8
6. Nonresidential Fixed Investment (billions of 1982 dollars)	471.8	489.0	3.6
7. New Private Housing Units Started (annual rate, millions)	1.7	1.8	5.0 ²
8. Change in Business Inventories (billions of 1982 dollars)	7.3	17.9	11.9 ³
9. Treasury Bill Rate (3-month, percent)	7.5	7.0	-0.5 ¹
10. Consumer Price Index (annual rate)	3.6	3.3	-0.2 ¹

Quarterly Projections of GNP and Other Economic Indicators, 1986-87

	1985 Q4 Actual	1986					1987 Q1	Percent Change	
		Q1	Q2	Q3	Q4	Q4 85 to Q4 86		Q1 86 to Q1 87	
		Forecast							
1. Gross National Product (\$ billions)	4075.1	4138.0	4204.0	4280.0	4352.0	4418.0	6.8	6.8	
2. GNP Implicit Price Deflator (1982 = 100)	113.0	114.0	114.7	115.8	117.0	117.8	3.5	3.3	
3. GNP in Constant Dollars (billions of 1982 dollars)	3605.0	3630.0	3657.0	3693.3	3718.0	3731.0	3.1	2.8	
4. Unemployment Rate (percent)	7.0	6.8	6.8	6.7	6.7	6.7	-0.3 ¹	-0.1 ¹	
5. Corporate Profits After Taxes (\$ billions)	143.8	145.0	148.0	150.5	152.5	151.0	6.1	4.1	
6. Nonresidential Fixed Investment (billions of 1982 dollars)	485.4	486.0	489.0	491.0	495.0	494.1	2.0	1.7	
7. New Private Housing Units Started (annual rate, millions)	1.7	1.8	1.8	1.8	1.8	1.8	4.9 ²	-1.1 ²	
8. Change in Business Inventories (billions of 1982 dollars)	0.1	10.0	14.0	16.0	19.0	20.0	18.9 ³	10.0 ³	
9. Treasury Bill Rate (3-month, percent)	7.1	7.0	7.0	7.0	7.1	7.1	0.0 ¹	0.1 ¹	
10. Consumer Price Index (annual rate)	3.6	3.2	3.2	3.5	3.6	4.0	0.1 ¹	0.8 ¹	

SOURCE: National Bureau of Economic Research and American Statistical Association, Business Outlook Survey, March 1986. The figures on each line are medians of twenty-six individual forecasts.

¹Change in rate, in percentage points.

²Apparent discrepancies in percentage changes are caused by rounding.

³Change in billions of dollars.

The rates of change in the consumer price index average 3.3 percent for 1986 and rise from 3.2 percent (annual rate) in 1986:1 to 4.0 percent in 1987:1. These median forecasts also tend to be lower than their counterparts in the previous survey.

No Consensus That Interest Rates Will Continue to Decline

Forecasters are divided on where the three-month Treasury bill rate will be a year from now. Nine say it will be lower, ten higher, five unchanged (two do not

predict interest rates). The average for 1987:1 is 7.2 percent; the range is 6.5–8.2 percent. The quarterly averages show small rises in 1986:4 and 1987:1 but little movement otherwise. (They are close to 7 percent for 1986:1–1986:3 and 1986 as a whole.)

According to the median forecast, the rate on new high-grade corporate bonds will be 10.2 percent in 1987:1, the same as in 1986:1. Ten respondents anticipate declines, six rises, and three no change in the bond rate between the two dates.

The implied average forecasts of real interest rates differ depending on whether expected inflation is measured by the IPD or the consumer price index (CPI). When IPD is used, the real rates decline between 1986:1 and 1987:1, from 3.8 percent to 3.2 percent for the Treasury bill rate and from 7.0 percent to 6.2 percent for the corporate bond yield. When CPI is used, the real bill rate rises from 3.4 percent to 4.4 percent and the real bond yield from 6.6 percent to 7.4 percent.

Industrial Production and Inventory Investment Up, Trade Deficit Down

Output of manufacturing, mining, and utilities is expected to rise 3.6 percent in 1985–86 and 3.5 percent in 1986:1–1987:1, significantly more than the 2.2 percent gain recorded in 1984–85. Real inventory investment, which fell about \$90 billion between 1984:1 and 1985:4, will increase a modest \$20 billion by 1987:1. The trade deficit will be trimmed by about one-fifth as net exports of goods and services, in billions of 1982 dollars, move from –124 in 1986:1 to –99 in 1987:1. There is much dispersion around these average forecasts but also much agreement on the direction of the developments involved (which are widely ascribed to common causes already noted, namely the recent and expected changes in interest rates, and so forth).

Profits to Rebound This Year, Business Fixed Investment to Weaken

Corporate profits after taxes will gain 6.8 percent in 1985–86 and 4.1 percent in 1986:1–1987:1, according to the medians from the new survey, in contrast to the decline of 3.1 percent recorded in 1984–85. Quarterly averages suggest good earnings this year, with a possible drop early in 1987.

Nonresidential fixed investment in constant dollars is estimated to have increased 9.6 percent in 1985–86, but the prolonged slowdown has lowered the rates of capacity utilization, which many believe is depressing business demand for new plant and equipment. The projected increases for 1985–86 and 1986:1–1987:1 are 3.6 percent and 1.7 percent, respectively. But these

figures are based on group averages that hide much uncertainty and diversity of individual forecasts.

Less Growth in Consumption, More in Residential Construction

Real consumption expenditures will grow 2.6 percent in 1985–86 and 2.4 percent in 1986:1–1987:1. These numbers are lower than the corresponding group forecasts for real GNP. Consumption in constant dollars rose 3.3 percent 1984–85.

Housing starts are expected to increase 5 percent in 1985–86 but to decrease 1.1 percent in 1986:1–1987:1. They slipped 0.8 percent in 1984–85. Residential fixed investment in constant dollars is predicted to gain 6.4 percent in 1985–86 and 3.6 percent in 1986:1–1987:1. Its rise in 1984–85 was much less (1.8 percent).

Some Restrictions on Government Spending and Other Assumptions

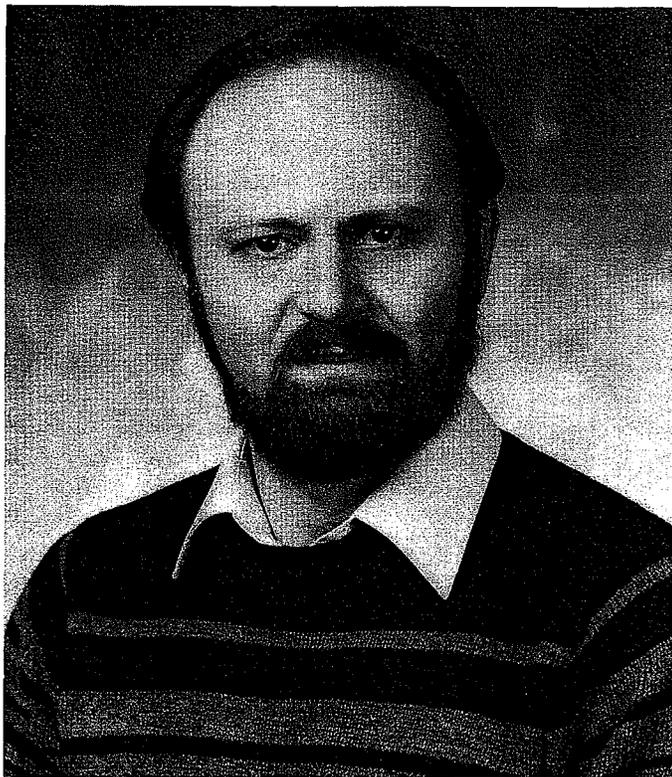
Federal government purchases of goods and services are expected to grow 4.8 percent in 1985–86 but slip 1.2 percent in 1986:1–1987:1. The corresponding median figures for state and local governments are 2.4 percent and 2.2 percent. In 1984–85, federal purchases in constant dollars rose 10.5 percent, state and local purchases 2.8 percent. Forecasters continue to assume that the growth of government spending will be curtailed as a result of the legislative efforts to reduce budget deficits. However, few respondents report explicit assumptions on significant changes in tax policy to be enacted in 1986–87: twelve say they foresee no such changes, while a few contemplate the possibility of small increases in taxes, mainly on corporations. Defense outlays may rise little in real terms in fiscal year 1987 or may even decline. Most common assumptions about monetary growth fall in the ranges of 5–10 percent for both M1 and M2. Oil prices per barrel are predicted to be between \$10 and \$20. The projected declines in the trade-weighted dollar vary from 5 percent to 17 percent.

This report summarizes a quarterly survey of predictions by 26 business, academic, and government economists who are professionally engaged in forecasting and are members of the Business and Economics Statistics Section of the American Statistical Association. Victor Zarnowitz of the Graduate School of Business of the University of Chicago and NBER, assisted by Robert E. Allison of NBER, was responsible for tabulating and evaluating this survey.

Dr. Andrew F. Brimmer, president of Brimmer & Company, Inc., a Washington, DC, economic and financial consulting firm, has been a member of NBER's Board of Directors since 1984.

Joshua Aizenman

Joshua Aizenman, an assistant professor at the University of Chicago's Graduate School of Business, has been a faculty research fellow in NBER's Program in International Studies since 1982. Aizenman, who was born in Poland, received his B.A. in mathematics and philosophy and his M.A. in economics from the Hebrew University in Jerusalem. He received his Ph.D. in international economics from the University of Chicago in 1981.



From 1981-84, Aizenman was an assistant professor of economics at the University of Pennsylvania. He joined the faculty of Chicago's Business School in 1984, and he will become an associate professor there this July.

Aizenman's research interests include exchange rate regimes, macroeconomic policies, and labor contracts in an open economy. His work has been published in a number of journals. In addition to his academic post, Aizenman is a consultant to the World Bank.

Aizenman, his wife Esti, and their daughters, Galli and Talli, live in Hyde Park (Chicago). His hobbies are music, travel, and "enjoying the Chicago weather."



Brimmer served as a member of the Board of Governors of the Federal Reserve System from 1966 until 1974. He then taught at the Harvard Business School until he founded his consulting firm in 1976.

Brimmer received his B.A. and M.A. in economics from the University of Washington (Seattle). After studying in India on a Fulbright fellowship, he returned to the United States and received his Ph.D. in economics in 1957 from Harvard University.

From 1958 to 1961, Brimmer was assistant professor of economics at Michigan State University. In 1961, he became assistant professor of finance at the Wharton School, University of Pennsylvania. He took a leave of absence in 1963 when he was named Deputy Assistant Secretary of Economic Policy Review for the U.S. Department of Commerce. In 1965, Brimmer was named Assistant Secretary of Economic Affairs for the same agency.

Brimmer serves as director or senior adviser to a number of major U.S. corporations. He has also received 14 honorary degrees and numerous awards throughout his distinguished career in government and private service. In addition, he is public governor and vice chairman of Commodity Exchange, Inc. (New York) and a columnist for *Black Enterprise* magazine.

Brimmer and his wife, Doris, have one daughter.

Robert J. Hodrick

Robert J. Hodrick has been a member of the Bureau's Program in International Studies since 1982. He was an NBER faculty research fellow from 1982-85 before being appointed a research associate.

Hodrick received his A.B. in public and international affairs from Princeton University in 1972 and his Ph.D. in economics from the University of Chicago in 1976. From 1976-83, he was a member of the economics faculty at Carnegie-Mellon's Graduate School of Industrial Administration. In 1983, he became an associate professor of finance at Northwestern's J. L. Kellogg Graduate School of Management; he was promoted to professor of finance there in 1985.



On leave from his teaching, Hodrick was an economist in the research department of the International Monetary Fund from May 1981-July 1982. He was also a member of the editorial board of the *Journal of International Business Studies* from 1982-84 and is currently on the editorial board of the *Journal of International Economics*. Hodrick's work has been published in a number of journals.

Hodrick is married to Katherine Schipper, a professor of accounting at the University of Chicago's Graduate School of Business. They live in the Lincoln Park area of Chicago and enjoy recreational activities such as scuba diving and bicycling.

Conferences

The Political Economy of Trade Policy

NBER's Trade Relations Project held a conference on The Political Economy of Trade Policy on January 10-11 at MIT's Endicott House in Dedham, Massachusetts. Participants at the conference, which was organized by Robert E. Baldwin and Robert Keohane, included both political scientists and economists. The following papers were presented and discussed:

Robert E. Baldwin, NBER and University of Wisconsin-Madison, "Collective Action and Trade Policy"

Discussant: Joanne Gowa, University of Pennsylvania

Judith Goldstein, Stanford University, "Ideas, Institutions, and American Trade Policy"

Discussant: Benjamin Cohen, Tufts University

Beth Yarbrough, Amherst College, and Robert Yarbrough, American International College, "Opportunism and Governance in International Trade: After Hegemony, What?"

Discussant: David Lake, University of California, Los Angeles

David Lake, "Political and Cosmopolitical Economy Revisited: Japan and Theories of Trade Policy"

Discussants: Beth and Robert Yarbrough

J. David Richardson, NBER and University of Wisconsin-Madison, "Strategic Bargaining as an Explanation for Protection"

Discussant: Stephen Krasner, Stanford University

James Cassing, University of Pittsburgh; Timothy McKeown, Carnegie-Mellon University; and John Ochs, University of Pittsburgh, "Regional Demands for Protection: an Empirical Analysis of the Tariff Cycle"

Discussant: Edward J. Ray, Ohio State University

Vinod Aggarwal, University of California, Berkeley; Robert Keohane, Harvard University; and David Yoffie, Harvard Business School, "Explaining Differential Life Histories of U.S. Voluntary Export Restraints"

Discussant: Stephen Magee, University of Texas

The paper by Baldwin analyzes the free-rider problem, using lobbying by firms within an industry for import protection as an example of where the problem arises. After summarizing Mancur Olson's classic work

on collective action (1965), Baldwin investigates the implications of game theory for understanding reactions in a group situation in which free rides are likely. He shows that while Olson's main points about small versus large groups still hold, the outcomes possible for small groups are more diverse than Olson implies.

Goldstein argues that contemporary American trade policy contains three components. First, policymaking is dominated by a belief in the efficacy of free trade. That belief has been encased in post-World War II laws and institutions that service continued trade liberalization and assure minimal legitimacy for social claims for protectionism. Second, U.S. trade policy has a mercantile component, a residue from the protectionist policies that existed before World War II. Finally, American trade policy is redistributive. The state both compensates uncompetitive sectors and helps industries adjust to foreign competition that results from liberalization. The paper examines the origins of each of these ideas, their inculcation into law, and their contemporary effect on policy. Each type of policy is characterized by a unique political process that gives rise to different models for the various sectors that get protection in the United States.

The paper by the Yarbroughs explores enforcement problems in international trade agreements. It examines possible mechanisms for dealing with those problems to maximize the benefits from trade liberalization while minimizing the costs of negotiation and enforcing agreements. After a country has negotiated a trade-liberalizing agreement with other countries, it may be in its economic interest not to liberalize its own trade if other countries maintain their negotiated commitments and if cheating cannot be detected costlessly and ascribed to the guilty country. A country that cheats does not have to incur the adjustment costs associated with reducing protection for domestic industries. It can take advantage of the opportunities for expansion created by liberalization abroad. If all countries think they can gain by cheating, all are likely to be worse off than if they had abided by the negotiated agreement.

The authors point out that not all trading situations are equally susceptible to cheating. If trade requires forms of investment for which there are no alternative uses—for example, investment in port facilities, or in specialized equipment needed solely for export production—then countries are more susceptible to situations in which one country threatens to renege on its part of an agreement (thereby making the specialized investments worthless) unless it secures better terms. In these circumstances, however, if there is a dominant trading nation that is willing to enforce liberalizing agreements in the interests of all, then the possibility of such cheating is greatly reduced. In the absence of a dominant country that serves as arbitrator and enforcer, but with specialized, trade-related investments, bilateral trading agreements and custom union arrangements are likely to provide more protection for a country. Cheating can be detected more easily, and there is a more direct and continuing relationship among

the countries involved. Quite aside from whether there is one dominant nation, the incentive for cheating will also be low if the investments required for trading can be shifted easily to domestic uses or can be adapted easily for trade with another country.

Lake analyzes Japanese trade policy since World War II in terms of both "the microeconomic theory of protection" and "the theory of international economic structures." The microeconomic theory of protection ascribes protection to the greater incentive and ability of producers, compared to consumers, to organize and influence the political process. As a result, politicians—under pressure from failing industries—promote trade restrictions that benefit the few at the expense of the many. In contrast, the theory of international economic structures assumes that nation-states are the dominant actors within the international system and that these states pursue national power, economic stability, and economic utility. Stability and utility are subordinate to national power, which is the primary goal. This theory holds that protection is the natural state of affairs and perceives that if free trade is a goal, it must be subsidized.

Lake concludes that both theories are needed to explain post-1945 Japanese trade policy. As in the United States and elsewhere, the pattern of protection across industries appears related to comparative disadvantage and thus is consistent with the microeconomic theory of protection. However, the timing and direction of change of Japanese trade policy seem to be explained by the theory of evolving international economic structures. In his view, while the two approaches are distinct and premised on different simplifying assumptions, they can be reconciled, and both are necessary for an understanding of national trade policies.

Richardson first summarizes the main strands of the recent literature that applies strategic economic models to trade policy. He then assesses the practical implications of this analysis for actual trade policy. As he points out, one part of the literature deals with strategic interactions among governments, while another focuses on the manner in which government trade policy can shift in favor of the home country the distribution of profits among domestic and foreign firms operating in an imperfectly competitive trading environment. Richardson concludes from his survey that only defensive, rules-based versions of strategic trade policy—active dissuasion—could work for the United States, given the structure of government and the environment in which it interacts with firms. He further argues that the U.S. government stands a better chance of succeeding in active dissuasion if its object is other governments, not imperfectly competitive firms.

Cassing, McKeown, and Ochs present a theory of tariff cycles aimed at explaining why free traders have their best chances of winning at peaks of business cycles, while protectionists have the best chance of securing increased import barriers at the troughs of cyclical activity. It rests upon difference in regional interests over the business cycle.

When general economic conditions are poor, "old" regions—that is, regions that have lost their competitive advantage in the product of a particular industry to other "new" regions—will join members of the industry located in new regions in pressing for protection. Both will benefit from the greater degree of utilization of existing capacity that import protection will bring. However, in good times, when full capacity utilization already exists in both regions, members of an industry located in an old region know that the demand for new capacity caused by additional protection will be satisfied by building this capacity in the new regions. Thus, in good times, old regions desert their respective protectionist coalitions. Both new and old export-oriented regions will lobby for free trade at all phases of the business cycle, but the authors believe the political situation is such that old, import-competing regions outweigh new, export-oriented regions, and thus the balance of political pressure will favor protectionism in bad times. Using data on industry filings for various trade policy actions and using a probit model to relate these filings to the regional age distribution of an industry (as summarized by the number of old regions for the industry), they find some support for their theory.

Aggarwal, Keohane, and Yoffie develop a demand-and-supply model to explain the evolution of protectionism after it has been imposed. In their view, three patterns can evolve: the protection may be permanent, temporary, or sporadic. To explain which of these patterns emerges, they emphasize two factors not usually stressed in discussions of protection: the height of barriers to entry in the industry, and the exit and adjustment strategies of the domestic firms. For example, in textiles and apparel, where protection appears to have become permanent, low entry barriers prevented existing firms from capturing the profits associated with import protection. Furthermore, there are no attractive exit options. Thus, pressures for protection become continuous as firms remain in poor economic condition and become trapped in the industry.

In the steel industry, high entry barriers enabled protection to work in the sense of generating greater profits for existing firms, but there was an absence of effective adjustment by domestic firms. Consequently, protection has been sporadic. Protection in the auto industry also has generated greater profits for existing firms as a result of high entry barriers. Thus, both the demand for and the willingness of the government to supply protection decreased and the voluntary export restraints were lifted. In the authors' view, whether auto protection will turn out to be temporary or will recur depends to a considerable extent on the effectiveness of the adjustment strategies pursued by domestic firms.

Conference Calendar

Each *NBER Reporter* includes a calendar of upcoming conferences and other meetings that are of interest to large numbers of economists (especially in academia) or to smaller groups of economists concentrated in certain fields (such as labor, taxation, finance). The calendar is primarily intended to assist those who plan conferences and meetings, to avoid conflicts. **All activities listed should be considered to be "by invitation only," except where indicated otherwise in footnotes.**

Organizations wishing to have meetings listed in the Conference Calendar should send information, comparable to that given below, to Conference Calendar, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please also provide a short (fewer than fifty words) description of the meetings for use in determining whether listings are appropriate for inclusion. The deadline for receipt of material to be included in the Summer 1986 issue of the *Reporter* is May 15. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss at (617) 868-3900.

May 1986

Conference: Research Project on Europe-U.S. Trade Relations, NBER

May 1-2, 1986

Annual Meeting, Association of Private Pension and Welfare Plans

May 2-3, 1986

Universities Research Conference: Economic Fluctuations, NBER

May 2-3, 1986

Political Economy Conference, Carnegie-Mellon University

May 8-10, 1986

LDC Debt Conference, NBER

May 16-18, 1986

CEME Decentralization Conference, NBER

May 19-20, 1986

Spring Symposium, National Tax Association-Tax Institute of America*

June 5-7, 1986

International Conference, International Association of Energy Economists*

June 12-14, 1986

Conference: European-US Trade Relations, NBER/Center for European Policy Studies

June 24-26, 1986

International Seminar on Macroeconomics, NBER

June 25-28, 1986

Summer Meeting, Econometric Society

July 1-5, 1986

Annual Conference, Western Economic Association

*Open conference, subject to rules of the sponsoring organization.

July 25, 1986

Program Meeting: Economic Fluctuations, NBER

July 27-31, 1986

Annual Meeting, American Agricultural Economics Association*

August 4-8, 1986

Conferences in International Studies, NBER

August 14-15, 1986

Public Sector Unionism, NBER

August 18-21, 1986

Annual Meeting, American Statistical Association*

August 24-26, 1986

13th Annual Conference, European Association for Research in Industrial Economics*

August 28-31, 1986

22nd International Conference, Atlantic Economic Society*

September 1-2, 1986

Conference: Economics of Technology Policy, Center for Economic Policy Research

September 11-12, 1986

Brookings Panel on Economic Activity, Brookings Institution

September 13-17, 1986

Annual Meeting, National Association of Business Economists*

September 25-26, 1986

Anglo/French Colloquium, Center for Economic Policy Research

October 10, 1986

Program Meeting: Economic Fluctuations, NBER

October 16-17, 1986

Economic Policy Panel Meeting, Center for Economic Policy Research

October 23-24, 1986

Program Meeting: Taxation, NBER

November 6-8, 1986

North American Conference, International Association of Energy Economists*

November 9-12, 1986

79th Annual Conference, National Tax Association-Tax Institute of America*

November 17, 1986

"The Economics of Tax Policy," NBER

November 21-22, 1986

Universities Research Conference: The Economics of Government Expenditure Programs, NBER

November 23-25, 1986

Annual Meeting, Southern Economic Association*

December 12-13, 1986

State and Local Government Finance, NBER

December 28-30, 1986

Annual Conference, American Economic Association*

Winter 1986/7

United States in the World Economy, NBER

February 19-22, 1987

Mergers and Acquisitions, NBER

March 1987

Income and Wealth Conference: Measurement of Savings, NBER

March 6-7, 1987

The United States in the World Economy, NBER

March 12-13, 1987

Macroeconomics, NBER

March 26-28, 1987

Annual Meeting, Midwest Economic Association*

April 1987

Conference, Atlantic Economic Society*

April 3-5, 1987

International Coordination of Economic Policy, NBER

April 9-10, 1987

State and Local Government Finance, NBER

August 2-5, 1987

Annual Meeting, American Agricultural Economics Association*

August 17-20, 1987

Annual Meeting, American Statistical Association*

September 9-12, 1987

18th Annual Conference, Center for International Research on Economic Tendency*

September 27-October 1, 1987

Annual Meeting, National Association of Business Economists*

November 8-11, 1987

80th Annual Conference, National Tax Association-Tax Institute of America*

November 22-24, 1987

Annual Meeting, Southern Economic Association*

August 8-11, 1988

Annual Meeting, American Statistical Association*

September 25-28, 1988

81st Annual Conference, National Tax Association-Tax Institute of America*

September 25-28, 1988

Annual Meeting, National Association of Business Economists*

November 20-22, 1988

Annual Meeting, Southern Economic Association*

August 14-17, 1989

Joint Statistical Meetings, American Statistical Association*

September 17-20, 1989

Annual Meeting, National Association of Business Economists*

October 8-11, 1989

82nd Annual Conference, National Tax Association-Tax Institute of America*

November 19-21, 1989

Annual Meeting, Southern Economic Association*

*Open conference, subject to rules of the sponsoring organization.

Hausman Wins Clark Medal

NBER Research Associate Jerry A. Hausman was awarded the John Bates Clark Medal by the American Economic Association at its recent annual meeting in New York. Hausman, a professor at MIT, has been associated with NBER since 1979. He is an active member of the Bureau's programs in taxation, labor studies, and productivity and technical change.

The Clark Medal is awarded every other year to the economist under the age of 40 who is judged to have made the most significant contributions to economics. Hausman was cited for his work on theoretical and methodological econometrics, tax policy and public finance, and the effect of R and D on innovation.

All of the winners of the Clark Medal since 1973 are or have been NBER research associates: Franklin M. Fisher (1973), Daniel McFadden (1975), Martin Feldstein (1977), Joseph E. Stiglitz (1979), A. Michael Spence (1981), and James J. Heckman (1983). Earlier Clark medalists who are or were NBER research associates are Milton Friedman (1951), Zvi Griliches (1965), and Gary S. Becker (1967).

New Olin Fellows Named

The Bureau recently selected six Olin Fellows for 1986-87: Harry Bowen, John Y. Campbell, Susan Collins, Charles M. Engel, Kevin Lang, and Matthew D. Shapiro. Olin Fellows spend one year at NBER's Cambridge office doing empirical research and are free of all teaching and university responsibilities during that time.

Bowen received his Ph.D. from the University of California at Los Angeles and teaches at New York University. His research topic will be patterns in international trade.

Collins received her Ph.D. from MIT and teaches at Harvard University. She will examine the effects of exchange rate misalignment.

Campbell received his Ph.D. from Yale University and teaches at Princeton University. He will study the relationship between consumption and interest rates.

Engel holds a Ph.D. from the University of California at Berkeley and teaches at the University of Virginia.

His research topic is the effect of budget deficits on interest rates.

Lang, who received his Ph.D. from MIT and teaches at the University of California at Irvine, will study dual labor markets and efficiency wages.

Shapiro holds a Ph.D. from MIT and teaches at Yale University. He will analyze the relationships among output, investment, and the cost of capital.

West Coast Meeting of Macroeconomists

Members and guests of NBER's Program in Economic Fluctuations met in Palo Alto on January 31. The agenda for the one-day gathering was:

Jeremy Greenwood and Gregory W. Huffman, University of Western Ontario, "A Dynamic Equilibrium Model of Inflation and Unemployment"

Discussant: Robert G. King NBER and University of Rochester

John Y. Campbell, NBER and Princeton University, "Does Saving Anticipate Declining Labor Income? An Alternative Test of the Permanent Income Hypothesis"

Discussant: Robert E. Hall, NBER and Stanford University

Albert Marcet, University of Minnesota and Thomas J. Sargent, NBER and Hoover Institution, "Convergence of Least-Squares Learning Mechanisms in Self-Referential Linear Stochastic Models"

Discussant: Mark Feldman, University of California, Santa Barbara

Lars Peter Hansen, NBER and University of Chicago, and Ravi Jagannathan, Northwestern University, "Using Asset Market Data to Restrict the Volatility of Intertemporal Marginal Rates of Substitution"

Discussant: Michael Rothschild, NBER and University of California, San Diego

John B. Taylor, NBER and Stanford University, "What Can Be Learned from a Big, Multicountry, Rational Expectations Econometric Model?"

Discussant: Richard Meese, University of California, Berkeley

Christopher A. Sims, NBER and University of Minnesota, "A Rational Expectations Framework for Short-Run Policy Analysis"

Discussant: Robert E. Lucas, Jr., NBER and University of Chicago

The paper by Greenwood and Huffman presents a stochastic general equilibrium model designed to ana-

lyze the trade-off between inflation and unemployment. Key elements in their modified real business cycle model are that: the labor supply decision is nonconvex; money enters through a cash-in-advance constraint; and the technology is subject to stochastic shocks. Among other results, the model implies that the observed inflation-unemployment trade-off is negative.

Campbell examines a previously unexploited feature of the Permanent Income-Rational Expectations consumption model: that saving occurs because agents rationally expect labor income to decline in the future. Advantages of Campbell's approach are that the time series for income need not be stationary and that the degree to which the Permanent Income model fits the data can be characterized easily. He tests the "saving-for-a-rainy-day" hypothesis with both nondurable and total consumption data. His forecast moves quite closely with the saving series, and the Permanent Income hypothesis is sustained if a transitory error is included in the consumption function. The results are sensitive to the inclusion of a constant and additional lags.

Marcet and Sargent investigate the convergence properties of a learning mechanism in an economic environment in which agents attempt to uncover the economy's law of motion. The study is restricted to the class of linear stochastic models and considers a recursive least-squares learning mechanism (similar to a modified Kalman filter). The authors derive necessary and sufficient conditions for convergence and apply the mechanism to learning versions of the Cagan hyperinflation model and the Lucas-Prescott investment model.

Hansen's paper presents a theoretical model of asset payoffs, asset prices, and intertemporal marginal rates of substitution. The key theoretical relationship is that the equilibrium price of any payoff on a portfolio of securities can be represented as the conditional expectation of the cross product of the payoff and a corresponding intertemporal marginal rate of substitution. Hansen shows that several extant asset pricing models can be viewed as special cases of this general framework. He derives inequality restrictions on the (unconditional) means and variances of the intertemporal marginal rates of substitution implied by asset market data and reports on preliminary tests with aggregate data.

Two papers presented at the meeting consider the evaluation of economic policy in light of the "Lucas Critique." Taylor presents preliminary work with a multicountry, rational expectations model estimated with quarterly data for seven countries: Canada, France, West Germany, Italy, Japan, the United Kingdom, and the United States. The specifications of the aggregate demand, contract wage, price, and interest rate equations for each country are the same, and the economies are connected by exchange rate equations. The rational expectations constraint introduces significant computational complexity; Taylor discusses various solution techniques and computational requirements. Taylor's rational expectations model is capable of generating

comparisons of policy rules, anticipated changes in policy instruments, and counterfactual historical analysis. His paper concludes with simulation results for permanent, unanticipated changes in the money supply and government spending.

Following on previous work by Cooley-LeRoy-Raymon, Sargent, and himself, Sims argues that the rational expectations method of econometric policy evaluation is logically flawed because the parameters of policy rules, rather than being arbitrary constants, are best viewed as realizations from a probability distribution. Under this assumption, he begins by showing that a close relationship exists between the form of the econometric model that was the focus of the Lucas Critique and the form of the proposed solution. Unlike previous work, this paper then examines the usefulness of conditional projections in the analysis of policy choice. Sims presents an example based on a linear-quadratic framework in which conditional projections are capable of overcoming the problems plaguing the rational expectations method of policy evaluation. The information structure of the model plays a crucial role in the results; as long as the government is forced to base its imperfectly predictable policy choices on a noisy information variable and the public finds this information variable redundant, Sims argues that his proposed method of econometric policy evaluation will remain valid.

In addition to the authors and discussants, 45 macroeconomists from universities throughout the United States participated in the program meeting. Robert S. Chirinko, NBER and University of Chicago, also attended the meeting and assisted in the preparation of this report.

Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the *NBER Reporter* list titles 1-666 and contain abstracts of the Working Papers cited below.)

These reprints are free of charge to corporate associates and other sponsors of the National Bureau. For all others there is a charge of \$2.00 per reprint to defray the costs of production, postage, and handling. Advance payment is required on orders totaling less than \$10.00. Reprints must be requested by number, in writing, from: Reprint Series, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

667. "International Capital Mobility and the Coordination of Monetary Rules," by Nicholas Carozzi and John B. Taylor, 1985 (NBER Working Paper No. 1242)

668. "Activist Monetary Policy, Imperfect Capital Mobility, and the Overshooting Hypothesis," by David H. Papell, 1985 (NBER Working Paper No. 1244)
669. "The Distributional Impact of Social Security," by Michael D. Hurd and John B. Shoven, 1985 (NBER Working Paper No. 1155)
670. "Dynamic Behavior of Capital Accumulation in a Cash-in-Advance Model," by Andrew B. Abel, 1985 (NBER Working Paper No. 1549)
671. "Government Spending, Debt, and International Economic Interdependence," by Jacob A. Frenkel and Assaf Razin, 1985 (NBER Working Paper No. 1266)
672. "On the Interest Rate Elasticity of the Demand for International Reserves: Some Evidence from Developing Countries," by Sebastian Edwards, 1985 (NBER Working Paper No. 1532)
673. "Precautionary Saving and Accidental Bequests," by Andrew B. Abel, 1985 (NBER Working Paper No. 1372)
674. "A Stochastic Model of Investment, Marginal Q, and the Market Value of the Firm," by Andrew B. Abel, 1985 (NBER Working Paper No. 1484)
675. "External Debt, Budget Deficits, and Disequilibrium Exchange Rates," by Rudiger Dornbusch, 1985 (NBER Working Paper No. 1336)
676. "Supply Shocks and Monetary Policy Revisited," by Robert J. Gordon, 1984 (NBER Working Paper No. 1301)
677. "Policy Decentralization and Exchange Rate Management in Interdependent Economies," by Willem H. Buiter and Jonathan Eaton, 1985 (NBER Working Paper No. 531)
678. "Policy and Performance Links between LDC Debtors and Industrial Nations," by Rudiger Dornbusch, 1985
679. "Commodity Prices, Money Surprises, and Fed Credibility," by Jeffrey A. Frankel and Gikas A. Hardouvelis, 1985 (NBER Working Paper No. 1121)
680. "Inflation Vulnerability, Income, and Wealth of the Elderly, 1969-79," by Michael D. Hurd and John B. Shoven, 1985
681. "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants," by George J. Borjas, 1985 (NBER Working Paper No. 1515)
682. "Determinants of Neonatal Mortality Rates in the United States: A Reduced-Form Model," by Hope Corman and Michael Grossman, 1985 (NBER Working Paper No. 1387)
683. "On Consequences and Criticisms of Monetary Targeting," by Bennett T. McCallum, 1985 (NBER Working Paper No. 1596)
684. "Pricing and Location of Physician Services in Mental Health," by Richard G. Frank, 1985 (NBER Working Paper No. 1514)
685. "Indexing Social Security Benefits: A Separate Price Index for the Elderly?" by Michael J. Boskin and Michael D. Hurd, 1985 (NBER Working Paper No. 943)
686. "The Theory of Excess Burden and Optimal Taxation," by Alan J. Auerbach, 1985 (NBER Working Paper No. 1025)
687. "International Monetary Policy to Promote Economic Recovery," by Willem H. Buiter, 1985 (NBER Working Paper No. 1584)
688. "Money Demand Predictability," by V. Vance Roley, 1985 (NBER Working Paper No. 1580)
689. "The Effect of Unions on the Employment of Blacks, Hispanics, and Women," by Jonathan S. Leonard, 1985 (NBER Working Paper No. 1311)
690. "Optimal Price and Inventory Adjustment in an Open-Economy Model of the Business Cycle," by Robert P. Flood and Robert J. Hodrick, 1985 (NBER Working Paper No. 1089)
691. "Wage Flexibility and Openness," by Joshua Aizenman, 1985 (NBER Working Paper No. 1108)
692. "A Portfolio Crowding Out, Empirically Estimated," by Jeffrey A. Frankel, 1985 (NBER Working Paper No. 1205)
693. "Pricing FHA Mortgage Default Insurance," by Donald F. Cunningham and Patric H. Hendershott, 1984 (NBER Working Paper No. 1382)

Technical Papers Series

The following study in the NBER Technical Working Papers series is now available (see previous issues of the *NBER Reporter* for other titles). Like NBER Working Papers, these studies may be obtained by sending \$2.00 per paper to: Technical Working Papers, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Prepayment is required for all orders under \$10.00.

54. "Full versus Limited Information Estimation of a Rational Expectations Model: Some Numerical Comparisons," by Kenneth D. West, February 1986 (JEL No. 212)

Bureau Books

The following volumes may be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628. Academic discounts of 10 percent for individual volumes and 20 percent for standing orders for all NBER books published by the University of Chicago Press are available to university faculty; orders must be sent on university stationery.

Book on Capital Formation Published

Financing Corporate Capital Formation, edited by NBER Research Associate Benjamin M. Friedman, is now available from the University of Chicago Press. It is priced at \$19.95.

This volume contains the six papers presented at a Bureau conference in Williamsburg, VA, in 1984. At that meeting, the major results of NBER's study of the changing roles of debt and equity financing in U.S. capital formation were shared with a group of corporate chief financial officers.

Among the questions addressed in these papers are: What has been the actual use of debt versus equity financing by U.S. business corporations in recent years? What factors determine the market's pricing of debt and equity securities? How do governments affect these relationships? What effect does price inflation have? And, what is the relationship between corporations' real investment decisions and their financial decisions?

This book presents the chief results of the latest research by NBER associates on these and related topics in nontechnical language that is accessible to practitioners in the corporate and financial sectors as well as to students of the subject more broadly.

Friedman is the director of NBER's Program of Research in Financial Markets and Monetary Economics. He is also a professor of economics at Harvard University.

State and Local Finance Studied

Studies in State and Local Public Finance, edited by NBER Research Associate Harvey S. Rosen, will be

available from the University of Chicago Press in May, at a cost of \$33.00. This volume presents six papers delivered at a 1984 NBER conference. It examines the funding of state and local public expenditures.

The Rosen volume addresses a variety of issues, including: the role of tax-exempt bonds in local public finance, the impact of local taxation on firms' location decisions, the structure of state income and sales taxes, and the likely effects of the Reagan administration's proposed changes on the structure of federalism. It should interest both economists who study public finance and practitioners at all levels of government.

Rosen directs the Bureau's Project on State and Local Government Finance and is a professor of economics at Princeton University.

Black Youth Employment

The Black Youth Employment Crisis, edited by Richard B. Freeman and Harry J. Holzer, will be available from the University of Chicago Press in June. It is priced at \$55.00. The volume includes eleven papers presented at an NBER conference that focused on the employment situation for young black males in the United States. The work presented analyzes a number of factors that contribute to employment problems among black youth. The study shows how the youths' perception of the risks and rewards of crime induces them to choose it as an alternative to work. It also shows that the labor supply of black youths is very responsive to incentives to work.

Freeman is the director of the Bureau's Program in Labor Studies and professor of economics at Harvard University. Holzer is an NBER faculty research fellow in the labor program and assistant professor of economics at Michigan State University.

Current Working Papers

Individual copies of NBER Working Papers are available free of charge to corporate associates and other supporters of the National Bureau. Others can receive copies of the Working Papers by sending \$2.00 per copy to Working Papers, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please make checks payable to the National Bureau of Economic Research, Inc.

Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the Working Paper. Abstracts of all Working Papers issued since October 1985 are presented below. For previous Working Papers, see past issues of the *NBER Reporter*. The Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. Working Papers are not reviewed by the Board of Directors of NBER.

Supply-Side Economics: Old Truths and New Claims

Martin Feldstein

Working Paper No. 1792

January 1986

JEL No. 300

This paper examines the claims made at the beginning of the decade by the "new" supply-siders and contrasts their views with the traditional supply-side economics that has been a prominent part of economics since Adam Smith. The analysis gives particular attention to the pace of recovery and growth and to the revenue effects of the 1981 tax cut.

A Reformulation of the Economic Theory of Fertility

Gary S. Becker and Robert J. Barro

Working Paper No. 1793

January 1986

JEL No. 310

When parents are altruistic toward their children, their choices about fertility and consumption come from maximizing a dynastic utility function. Maximization implies: (1) an arbitrage condition for consumption across generations; and (2) equating the benefit from an extra child to the net cost of rearing that child. These two conditions imply that fertility in open economies is positively influenced by the world interest rate, the degree of altruism, and the growth of probabilities of child survival. Fertility depends negatively on the rate of technical progress and the growth rate of Social Security.

The growth of consumption across generations depends on changes in the net cost of rearing children, but not on interest rates or time preference. Even when we include elements of the life cycle, we conclude that the growth of aggregate consumption per capita depends in the long run on the growth of consumption across generations. Thereby we show that real interest rates and growth rates of consumption per capita are unrelated in the long run.

Reputation in a Model of Monetary Policy with Incomplete Information

Robert J. Barro

Working Paper No. 1794

January 1986

JEL No. 310

This paper extends previous models of "rules versus discretion" to include uncertainty about the policymaker's type. When people observe low inflation, they raise the possibility that the policymaker is committed to low inflation (type 1). This enhancement of reputation gives the uncommitted policymaker (type 2) an incentive to masquerade as the committed type. In equilibrium, the type 1 policymaker delivers surprisingly low inflation—with corresponding costs to the economy—over an extended interval. The type 2 person mimics this outcome for a while but shifts eventually to high inflation. The high inflation is surprising initially but subsequently becomes anticipated.

Discontinuities in Pension Benefit Formulas and the Spot Model of the Labor Market: Implications for Financial Economists

James E. Pesando

Working Paper No. 1795

January 1986

JEL No. 520

When analyzing tax and related issues, financial economists typically invoke the simplest and the most tractable model of the labor market. This is the spot model, in which the worker's cash wage plus accruing pension benefits must equal the value of the worker's marginal product in every period. This paper first identifies the discontinuities in a worker's cash wage that must occur under the spot model if the pension plan has typical "cliff" vesting and early retirement provisions. I then calculate the pension benefits actually accrued, at and around the dates of eligibility for those benefits, by members of five pension plans in Canada. Both exercises discredit the spot model. Finally, the paper reviews the underfunding puzzle, the measurement of pension liabilities, and the recapture of surplus assets in overfunded plans in light of the findings on actual benefits.

Money in the Utility Function: An Empirical Implementation

James M. Poterba and Julio J. Rotemberg

Working Paper No. 1796

January 1986

JEL Nos. 023, 311

This paper studies household demands for assets by allowing certain assets to contribute directly to utility. It estimates the parameters of an aggregate utility function that includes both consumption and liquidity services. These liquidity services depend on the level of various stocks of assets. We apply these estimates to the long- and short-run interest elasticities of the demand for money, time deposits, and Treasury bills. We also examine the impact of open-market operations on interest rates and present new estimates of the welfare cost of inflation.

1944, 1963, and 1985: Modiglianisque Macro Models

Stanley Fischer

Working Paper No. 1797

January 1986

In 1944 Franco Modigliani published a famous article summarizing the Keynesian model; in 1963, he extended the 1944 framework. This paper, written for a conference in honor of Modigliani, asks how the earlier papers would be modified in the light of recent developments in macroeconomics. The attempt is not to summarize modern macroeconomics but rather to describe the structure that modern macroeconomists should have in mind in thinking about the way that the economy and macroeconomic policy work. The paper argues that the basic structure of the 1963 model still stands, with modifications. The 1985 version is an extended Phillips-curve-augmented IS-LM model. The major modifications to the 1963 model are in the treatment of the Phillips curve and aggregate supply, in the analysis of expectations, and in the openness of the economy.

The Invariance of R and D to the Number of Firms in the Industry

Raaj Kumar Sah and Joseph E. Stiglitz

Working Paper No. 1798

January 1986

JEL No. 022

This paper presents certain remarkably simple results about the market allocation to R and D and how it

compares to a socially efficient allocation. We posit that a firm can undertake more than one project aimed at the same innovation, and we consider a product market characterized by Bertrand competition. We find that the market R and D (that is, the number of projects undertaken and the effort spent on different projects) is invariant to the number of firms. We also examine the effects of the number of firms on the gains from innovation to consumers, firms, and society. We show, in particular, that the market undertakes less R and D than is socially desirable.

The International Transmission and Effects of Fiscal Policies

Jacob A. Frenkel and Assaf Razin

Working Paper No. 1799

January 1986

JEL Nos. 431, 320

In recent years the world economy has been subject to large and unsynchronized changes in fiscal policies, high and volatile real rates of interest, large fluctuations in real exchange rates, and significant variations in spending in the private sector. This paper reviews some of the key facts that characterized the effects of fiscal policies during the first half of the 1980s. It also provides a simple analytical framework for the interpretation of these facts. The analytical framework builds on a two-country model of the world economy; we apply it to the transmission and effects of various changes in the time profile of taxes and of government spending. Generally, the predictions of the model concerning the relationship among the intercountry patterns of consumption, long- and short-term real rates of interest, real exchange rates, and fiscal policies are consistent with the stylized facts.

Coordination of Monetary and Fiscal Policies in the OECD

Warwick McKibbin and Jeffrey D. Sachs

Working Paper No. 1800

January 1986

JEL Nos. 431, 432

Discontent with the world monetary system has led to many proposals for reform. These proposals range

from enhanced consultations under the current regime of floating exchange rates to a regime of fixed exchange rates, as proposed by Ronald McKinnon. In this paper, we examine the implications of several alternative monetary arrangements for fiscal policy in the world economy. We focus in particular on two issues: the effects of alternative monetary arrangements on the international transmission of fiscal policy; and the implications of the alternative regimes for strategic aspects of fiscal policymaking.

As is generally the case in the discussion of exchange regimes, we find that the choice of the monetary system is crucially dependent upon the source and nature of the shocks to the world economy. We show that the monetary regime also has important implications for the transmission of fiscal policy in the world economy and for the nature of the strategic games played by fiscal authorities. Rigid rules of the game, as under fixed exchange rates, do not necessarily eliminate the inefficient equilibria that can occur when fiscal authorities behave noncooperatively.

Sectorial Wages and the Real Exchange Rate

Joshua Aizenman and Jacob A. Frenkel

Working Paper No. 1801

January 1986

JEL Nos. 431, 310

If a multisector economy experiences an exogenous demand shock that alters the equilibrium structure of relative prices, how should the structure of sectorial wages adjust? We address this question in the context of a multisector model of an open economy producing internationally tradable and nontradable goods. In order to focus on intersectorial wage structure without abandoning the competitive neoclassical paradigm, we assume that workers differ from each other in their absolute and relative skills. Such differences result in equilibrium wage differentials that are affected by the exogenous real shock. Because of the costs of negotiation, labor market contracts set nominal wages in advance of the realization of the stochastic shocks. Our analysis provides formulas for the optimal sectorial wage-indexation rules. The optimal rules alter both the *absolute* and the *relative* structure of sectorial nominal wages. We examine the dependence of the optimal wage adjustments on the degree of heterogeneity of the skill distribution and on the degree to which the economy is open to international trade; we also study the effects of various shocks and policies on the real exchange rate, real wages, and the distribution of income.

Nutrition and the Decline in Mortality since 1700: Some Additional Preliminary Findings

Robert W. Fogel

Working Paper No. 1802

January 1986

This paper is an extensive revision and expansion of NBER Working Paper No. 1402. It centers on a new time series of life expectations in the United States since 1720, constructed from the NBER/CPE (Center for Population Economics) pilot sample of genealogies.

Native-born Americans achieved remarkably long life expectations toward the end of the eighteenth century but then experienced a 70-year decline. A new rise began late in the 1850s, but it was not until 1930 that Americans again achieved the level of life expectation that was attained c.1790.

I use time series on average adult stature of national populations in North America and Europe as indexes of nutritional status (not diet alone, but diet net of prior claims). These series are highly correlated with the series on e_{10} and other measures of mortality. I estimate that improvements in nutritional status may have accounted for as much as four-tenths of the secular decline in mortality rates, but nearly all of this effect was concentrated in the reduction of infant mortality.

I also assess the effect of toxic substances on the mortality rates of the English peerage. I estimate the distribution of shortfalls in English supplies of food between 1540 and 1871, which reveals that famines were primarily the result of social misallocations of food rather than of large declines in supply. Finally, I adjust conventional estimates of U.S. per capita income for the increase in mortality, reducing the rate of economic growth between 1790 and 1860 by nearly 40 percent.

Tax Reform, Investment, and the Value of the Firm

Alan J. Auerbach and James R. Hines, Jr.

Working Paper No. 1803

January 1986

JEL No. 323

It is well understood that the taxation of corporate assets influences investment and firm valuation. This paper explores the consequences of postwar U.S. tax changes in a dynamic model that incorporates costs of adjustment and investor expectations of future tax reforms and macroeconomic variability. When viewed in a dynamic context, the tax code can have very different incentives than those implied by the usual static analysis. Simulation results suggest that investment is sensitive to future tax changes and movements of the business cycle. The paper also illustrates the implications of this analysis for the design of tax reforms.

Implications of the U.S. Net Capital Inflow

Benjamin M. Friedman
Working Paper No. 1804
January 1986
JEL No. 311

The rapidly growing net inflow of capital from abroad, mirroring the extraordinary deterioration of the U.S. export-import balance, has played a major role in equilibrating overall saving and investment in the United States in the face of unprecedentedly large and persistent federal government budget deficits during the 1980s. As a result of this capital inflow, the share of U.S. financial assets held by foreign investors is also growing rapidly. If the inflow continues, the increasing relative importance of foreign investors will in general change the equilibrium price and yield relationships determined in U.S. markets. In particular, because foreign investors, on average, hold far less of their portfolios in long-term debt instruments than do American investors, the increasing share of foreign ownership of U.S. financial assets is likely to raise the expected return premium on long-term debt, and hence to shift the composition of U.S. financial activity away from capital formation.

Nevertheless, the foreign capital inflow—and with it the U.S. export-import balance—may change in response to a variety of possible influences, including U.S. fiscal and monetary policies. Empirical estimates based on reduced-form equations indicate that a tightening of U.S. fiscal policy would significantly stimulate U.S. capital formation and would shrink the U.S. capital inflow (that is, improve the U.S. export-import balance) by even more. Analogous estimates indicate that an easing of U.S. money policy would also significantly stimulate capital formation and shrink the capital inflow, but with the relative magnitudes of the two effects approximately reversed.

Does Saving Anticipate Declining Labor Income? An Alternative Test of the Permanent Income Hypothesis

John Y. Campbell
Working Paper No. 1805
January 1986
JEL No. 131

The permanent income hypothesis (PIH) implies that people save because they rationally expect their labor income to decline; they save “for a rainy day.” It follows that saving should be at least as good a predictor of declines in labor income as any other forecast that can be constructed from publicly available information.

The paper tests this hitherto ignored implication of the PIH, using quarterly aggregate data for 1953–84 in the United States. I use a vector autoregression (VAR) for saving and changes in labor income to generate an unrestricted forecast of declines in labor income. In the VAR, saving Granger-causes labor income changes as one would expect if the PIH is true. The mean of the unrestricted forecast is far from the mean of saving, but the dynamics of the two series are quite similar.

The paper presents both formal test statistics and an informal evaluation of the “fit” of the PIH. By contrast with most of the recent literature, the results here are valid when income is nonstationary.

Money Announcements, the Demand for Bank Reserves, and the Behavior of the Federal Funds Rate within the Statement Week

John Y. Campbell
Working Paper No. 1806
January 1986
JEL Nos. 311, 312

The effect of money stock announcements on the federal funds rate has been attributed informally to the information conveyed by the announcements about aggregate demand for reserves. This aggregate information hypothesis explains the effect without reference to Federal Reserve intervention in the funds market. In this paper, I provide a formal model of the aggregate information hypothesis under lagged reserve accounting. The model relies on imperfect information in the funds market, and on imperfect bank arbitrage of reserve demand between days of the week. I present some stylized facts about the behavior of the funds rate in 1980–83.

The Economic Performance of Survivors After Layoffs: A Plant-Level Study

Casey Ichniowski
Working Paper No. 1807
January 1986

This study tests for the empirical relationship between layoffs and the economic performance of workers who remain after the layoffs. Previous studies performed in laboratory settings often have found increases in the efficiency of workers after layoffs. This analysis is the first to test for this relationship using operating data from a set of similar establishments. Within the framework of a modified Cobb–Douglas production

function, layoffs do not influence subsequent productivity in the establishments in this study's sample. The seniority systems governing layoffs, and the high levels of capital intensity in these establishments, may also help to explain the difference between the findings in the laboratory studies and those obtained in this analysis.

Public Sector Recognition Strikes: Illegal and Ill-Fated

Casey Ichniowski
Working Paper No. 1808
January 1986

This study investigates the relationship between unionization and strike activity by nonunion public employees. Examining the strike activity and unionization rates of some 600 nonunion municipal police departments from 1972 to 1978, I find that recognition strikes are concentrated where bargaining laws provide little or no protection of bargaining rights for municipal police. However, these strikes do not increase the unionization propensities of these police departments.

Public Sector Union Growth and Bargaining Laws: A Proportional Hazards Approach with Time-Varying Treatments

Casey Ichniowski
Working Paper No. 1809
January 1986

This study uses a Cox proportional hazards model to estimate the relationship between collective bargaining policies at the state level and union growth in the public sector. The proportional hazards analysis uses data on approximately 800 municipal police departments. The timing of unionization in these departments clearly indicates that unionization rarely precedes the enactment of a statute. Where bargaining laws have not been enacted, formal collective bargaining between municipalities and their police is virtually nonexistent. Moreover, the proportional hazards analysis that controls for the effects of other state-level and municipal-level covariates indicates that the bargaining laws and policies are the most important determinant of unionization among police. Among different types of bargaining policies, "duty-to-bargain" provisions lead to higher unionization rates than do statutes that permit, but do not require, employers to bargain with police. However, after controlling for the effects of other covariates, there appears to be no difference in the unionization rates between the states that have duty-to-bargain provisions and an interest arbitration mechanism and those states that have duty-to-bargain provisions without such a mechanism for resolving disputes.

Stopping Hyperinflations Past and Present

Rudiger Dornbusch and Stanley Fischer
Working Paper No. 1810
January 1986

We examine four successful stabilizations from high inflation—Germany in 1923, Austria in 1922, Poland from 1924–27, Italy in 1947—and the two ongoing attempted stabilizations in Israel and Argentina, with the aim of identifying general lessons from those episodes.

The key issues in a stabilization are the budget, the exchange rate, and money. Budget deficits were significantly reduced in each case but were not completely removed in all cases. The exchange rate was pegged in each case, although in all but the Italian case, each stabilization was also preceded by at least one episode in which attempted stabilization through exchange rate pegging was unsuccessful. As pointed out by Sargent and others, money growth rates were high after each stabilization, suggesting that any stabilization that strictly controls the growth of money will produce a serious recession. A common feature of stabilizations is a period of extremely high real interest rates.

The modern attempts differ from earlier ones by also using wage and price controls. They also differ in that the Argentinian and Israeli economies were in far better shape in 1985 than the classical hyperinflationary economies.

Inflation and Wage Dispersion

Allen Drazen and Daniel S. Hamermesh
Working Paper No. 1811
January 1986
JEL Nos. 023, 824

A large body of empirical work has demonstrated that higher inflation, especially when it is unexpected, leads to greater dispersion in the distribution of price changes across subaggregates. A sparse and more recent literature suggests exactly the opposite effects on the distribution of wage changes. This study first reconciles these apparently opposite results by using a model in which shocks to the economy can affect both wages and prices and the demand for indexing. If the positive effect of shocks on the demand for indexing is sufficiently large, the dispersion of changes in wages or prices will be reduced even though the shocks' direct effect is to increase this dispersion. Implicitly from the evidence, this offset is large enough in wage setting, but not so large in price determination.

We provide additional evidence on the relationship between inflation and the dispersion of wage changes in empirical work for 14 Israeli manufacturing industries from 1956–82. The results suggest that in Israel,

just as in the United States (on which previous work has been conducted) with its much less rapid and variable inflation, dispersion also decreased with unexpected price inflation.

The Response of Interest Rates to Money Announcements under Alternative Operating Procedures and Reserve Retirement Systems

V. Vance Roley

Working Paper No. 1812

January 1986

JEL No. 311

This paper examines, both theoretically and empirically, the response of interest rates to money announcement surprises. In the theoretical models developed, not only changes in operating procedures, but also reserve requirement systems, potentially affect the response. Moreover, under the current two-week contemporaneous reserve requirements adopted in February 1984, the responses in the first and second weeks of the two-week reserve maintenance period may differ. The empirical results generally conform to the predictions of the theoretical models. The response of the Treasury bill yield to money announcement surprises changed significantly following changes in either operating procedures or reserve requirement systems in October 1979, October 1982, and February 1984.

The Rigidity of Prices

Dennis W. Carlton

Working Paper No. 1813

January 1986

This paper presents evidence on the amount of price rigidity that exists in individual transaction prices. Using the Stigler-Kindahl data, I examine the behavior of individual buyers' prices for certain products used in manufacturing. I find that the degree of price rigidity in many industries is significant. It is not unusual in some industries for prices to individual buyers to remain unchanged for several years.

Further, even for what appear to be homogeneous commodities, the correlation of price changes across buyers is very low. Nor is there any evidence of an asymmetry in price rigidity. In particular, prices are not rigid downward.

I also find that the fixed costs of changing price, at least to some buyers, seem trivial. There are plenty of instances where small price changes occur. The level of industry concentration is also strongly correlated with rigid prices. The more concentrated the industry, the longer is the average spell of price rigidity.

Finally, there appears to be a relationship among price rigidity, size of price change, and the length of time a buyer and seller deal with each other. I interpret these findings as evidence that it is erroneous to focus attention on price as the exclusive mechanism for allocating resources. Nonprice rationing is not a fiction; it is a reality of business and may be the efficient response to economic uncertainty.

Estimated Macroeconomic Effects of Deficit Targeting

Ray C. Fair

Working Paper No. 1814

January 1986

This paper uses my U.S. econometric model to estimate some macroeconomic effects of deficit targeting. I examine the response of the economy to real and price shocks in a number of cases. Each case corresponds to a particular assumption about fiscal policy and a particular assumption about monetary policy. I also present estimates of the size of the government spending cuts that are needed to meet a given deficit goal under different assumptions about monetary policy.

Technological Opportunity and Spillovers of R and D: Evidence from Firms' Patents, Profits, and Market Value

Adam B. Jaffe

Working Paper No. 1815

January 1986

JEL No. 621

This paper presents evidence that firms' patents, profits, and market value are systematically related to the "technological position" of firms' research programs. Further, firms are seen to "move" in technology space in response to the pattern of contemporaneous profits at different positions. These movements tend to erode excess returns.

I model "spillovers" of R and D by examining whether the R and D of neighboring firms in technology space has an observable impact on the firms' R and D success. Firms whose neighbors do a lot of R and D produce

more patents per dollar of their own R and D, with a positive interaction that gives high R and D firms the largest benefit from spillovers. In terms of profit and market value, however, there are both positive and negative effects of nearby firms' R and D. The net effect is positive for high R and D firms, but firms with R and D about one standard deviation below the mean are made worse off overall by the R and D of others.

Variation in Employment Growth in Canada: The Role of External, National, Regional, and Industrial Factors

Joseph G. Altonji and John C. Ham

Working Paper No. 1816

January 1986

JEL Nos. 824, 131

This paper presents a method for assessing the impact of external, national, and sectorial shocks on Canadian employment fluctuations at the national, industry, and provincial levels. We pay special attention to the contribution of sectorial shocks to aggregate employment fluctuations. Shocks that initially affect specific industries and provinces can induce aggregate fluctuations not only because national employment is the sum of employment in various sectors but also because of feedback across sectors.

The analysis is based on an econometric model that relates employment growth in each province and industry to: the current and lagged change in U.S. output; the lags of employment growth at the national, industry, and provincial levels; a Canadian national shock; and shocks affecting specific industries, specific provinces, and specific province-industry pairs. We estimate the model using annual data on Canadian employment at the province-industry level.

The results suggest that U.S. shocks are responsible for two-thirds of the steady-state variance in the growth of Canadian national employment, while the Canadian national shock accounts for approximately one-quarter of this variance. Taken together, industry-specific, province-specific, and province-industry-specific shocks account for about one-tenth of the variance of Canadian national employment growth. Although U.S. shocks are the dominant influence on aggregate employment growth in Canada, sectorial shocks account for about 30 percent of the variance in national employment caused by Canadian sources.

We also provide estimates of the contribution of U.S., Canadian, national, industry, and provincial shocks to the variance of employment in specific industries and provinces.

Fixed Price versus Spot Price Contracts: A Study in Risk Allocation

A. Mitchell Polinsky

Working Paper No. 1817

January 1986

This paper deals with the risk-allocation effects of alternative types of contracts used to set the price of a good to be delivered in the future. Under a fixed price contract, the price is specified in advance. Under a spot price contract, the price is the price prevailing in the spot market at the time of delivery. I examine these contract forms in the context of a market in which sellers have uncertain production costs and buyers have uncertain valuations. The paper derives and interprets a general condition determining which contract form would be preferred when the seller and/or the buyer is risk averse. In addition, I provide an example in which a spot price contract with a floor price is superior to both a "pure" spot price contract and to a fixed price contract.

A Time-Series Model of Housing Investment in the United States

Sherwin Rosen and Robert H. Topel

Working Paper No. 1818

January 1986

This paper formulates and explains a decentralized market theory of investment based on rising supply price. In a competitive market, asset prices embody all available information and serve as "sufficient statistics" for future market conditions. Construction is determined myopically by marginal cost pricing: rising supply price constrains aggregate investment. Market dynamics imply that anticipated pulses in demand and in interest rates lead to "bubbles" in prices, rentals, and construction; it pays to "build ahead of demand" in the presence of rising supply price.

This model, similar to q theory, assumes that long- and short-run elasticities of supply are identical. Short-run supply is less elastic than long-run supply when internal adjustment costs are superimposed on rising supply price. Then the current construction decision is no longer myopic and current price (or current q) is no longer sufficient for investment. Instead, builders must anticipate the future path of asset prices for current construction decisions.

We estimate this enriched model under the hypothesis of rational expectations. The short-run elasticity is 1.0 in quarterly data. The long-run elasticity is 3.0. The long run is achieved within one year, indicating substantial built-in flexibility in the industry to accommodate great volatility in housing construction. Elastic supply helps account for the large fluctuations in output and employment observed in this industry.

The data also show that prices alone do not clear the market. Other nonprice dimensions, including expected time-to-sale and overall transactions volume, play independent roles that remain to be explained.

Job Duration, Seniority, and Earnings

Katharine G. Abraham and Henry S. Farber

Working Paper No. 1819

January 1986

The stylized fact that seniority and earnings in a cross section are positively related, even after controlling for total labor market experience, has served as the basis for the theoretical analyses of implicit labor contracts. These analyses suggest that workers post bonds, in the form of deferred compensation, in order to ensure their continued performance at an adequate level. An alternative interpretation is that good workers, or workers in good jobs or good matches, earn more throughout the job and have longer job durations. Another stylized fact, that labor market experience and earnings in a cross section are positively related, has been taken as evidence of the importance of general human capital accumulation. An alternative interpretation of this evidence is that workers with more experience have had more time to find good jobs and/or good matches, resulting in higher earnings.

This paper estimates earnings functions, including a measure of the completed duration of jobs, in order to distinguish between the competing hypotheses regarding seniority and experience. There are three main results: First, workers in longer jobs earn significantly more in every year of the job than do workers in shorter jobs. Second, controlling for completed job duration eliminates most of the apparent return to seniority found in standard cross-section models. Thus, it appears that implicit contracts that provide for workers posting bonds through deferred wage payments are less important than has been believed. Third, there is evidence that for blue collar workers a part of the small observed (cross-sectional) return to labor market experience is the result of sorting of workers into better jobs over time. There is no evidence of sorting for white collar workers.

Work Rules, Featherbedding, and Pareto-Optimal Union-Management Bargaining

George Johnson

Working Paper No. 1820

January 1986

JEL No. 830

The recent literature on the economic behavior of unions is dominated by a controversy over whether or not bargaining is Pareto optimal. If unions care about employment as well as wages, then efficient bargains between unions and management "should" involve both of these variables rather than only wages. In fact, explicit bargaining over employment levels is virtually unknown. However, there is implicit bargaining over employment in the form of rules concerning the labor/capital ratio, job assignment, work speeds, and the like.

This paper examines a model of "semiefficient" bargaining in which the union and the firm bargain over wages and various types of work rules. The results are compared to the outcomes that are associated with fully efficient bargaining (that is, over wages and the level of employment) and bargaining solely over wages. The case in which the union and the firm mutually consent to "featherbedding" agreements (requiring the hiring of workers with zero marginal product) is particularly interesting. The major conclusion of the paper is that the outcome of collective bargaining is different in the case of negotiations over work rules and wages than in both the cases of fully efficient bargaining and of bargaining solely over wages. In general, however, the outcome of this "partially efficient" bargaining process is closer to the outcome of bargaining solely over wages than to that associated with fully efficient bargaining over both wages and employment.

Explorations in Monetary History: A Survey of the Literature

Michael D. Bordo

Working Paper No. 1821

January 1986

JEL Nos. 040, 311, 431

Monetary economists have long been interested in economic history as a test of economic theory. This paper surveys some recent work in monetary history in the context of the modern quantity theory of money and the new classical macroeconomics. The paper encompasses: (1) the development of monetary statistics and the determinants of money supply and demand;

(2) the use of Granger-Sims causality tests on the relationships among money, prices, and output; (3) historical studies of the secular behavior of velocity; (4) evidence from the Great Depression and other financial crises; (5) historical evidence for the long-run and short-run neutrality of money; and (6) domestic and international aspects of monetary standards. The paper concludes with an agenda for future research.

Generating a Sharp Disinflation: Israel 1985

Michael Bruno

Working Paper No. 1822

January 1986

On July 1, the Israeli government adopted a comprehensive emergency program for stabilization and recovery. It has had dramatic consequences, at least in the very short run. Within a few months, inflation was down to 1-2 percent a month; foreign exchange reserves were rising rapidly; and, despite rather harsh contractionary fiscal and monetary policies, average unemployment did not rise by more than two percentage points above the pre-July level.

This paper discusses the background of the acute crisis in the Israeli economy, the conceptual underpinnings of the stabilization plan, and the first six months of its implementation. Apart from the more conventional fiscal and monetary measures, with partial deindexation, I emphasize stabilization of the exchange rate as a central nominal anchor for the price system, with a wage policy package. I consider further budget restraint as well as wage moderation as keys to continued success of the stabilization effort. Both of these conditions will be tested in the new fiscal year starting April 1986.

The New Protectionism: A Response to Shifts in National Economic Power

Robert E. Baldwin

Working Paper No. 1823

January 1986

JEL No. 420

The new protectionism threatening the international trading regime is related to significant structural changes in world production. These changes have brought about a decline in the dominant economic position of the United States, a concomitant rise of the European Community and Japan to international economic prominence, and the emergence of a highly competitive group of newly industrializing countries.

For the United States, the adjustment process has been difficult. Government and business leaders have gradually adopted the view that unfair foreign trading practices are the main cause of the country's competitive problems. By focusing on more vigorous enforcement of U.S. statutes and rules on fair trade of the General Agreement on Tariffs and Trade, they are able to press for import protection and still maintain that they support the type of open trading regime that the United States worked to establish after World War II.

While it is possible that particular protectionism will continue to spread and lead to an essentially closed international trading order, a more sanguine outcome seems possible, supported by the three major trading powers. This is the emergence of a regime characterized by more trade-distorting government interventions than at the height of American hegemonic influence and by the existence of a significant group of industries receiving government assistance. However, while new industries will be added to this group, assistance will be withdrawn from others as they lose political influence. On balance, the list need not increase over time or, if it does, only very slowly. Such a regime will not yield the growth and efficiency benefits of an open trading system, but at least it will not lead to the disastrous economic and political consequences brought about by the trading order that prevailed in the 1930s.

Monetary Policies in Interdependent Economies with Stochastic Disturbances: A Strategic Approach

Stephen J. Turnovsky and Vasco d'Orey

Working Paper No. 1824

January 1986

JEL No. 432

This paper uses a standard, two-country, stochastic macromodel to analyze strategic monetary policies. It considers three noncooperative equilibria: Cournot, Stackelberg, and Consistent Conjectural Variations. It also considers the Pareto-optimal equilibrium, in which aggregate joint costs are minimized and all strategic equilibria are compared to the perfectly fixed and flexible exchange rate regimes. The main conclusions are: (1) Demand shocks are much less problematical than supply disturbances from the viewpoint of macro stabilization; (2) the gains from cooperation are typically small; and (3) the strategic equilibria all show substantial margins of superiority over the fixed and flexible regimes.

Layoffs, Recall, and the Duration of Unemployment

Lawrence F. Katz

Working Paper No. 1825

January 1986

This paper shows that the prospect of recall to previous employer is important for a significant number of the unemployed in the United States. The possibility of recalls also has important implications for the study of durations of unemployment spells.

A job search model that allows for recalls leads naturally to a competing-risks specification of the distribution of durations of layoff unemployment spells; recall and taking a new job are alternate routes for leaving unemployment. I analyze a large sample of observations of individual layoff unemployment spells derived from the Panel Study of Income Dynamics. The common finding for samples containing individuals with recall prospects—that the rate of escape from unemployment declines with spell duration—results almost entirely from a declining recall rate. The apparent declining recall rate may indicate important uncontrolled heterogeneity rather than true negative duration dependence. I find that unemployment insurance (UI) recipients have strong positive duration dependence in their rate of finding new jobs. Factors raising the likelihood and value of recall appear to depress the rate of finding new jobs.

I also find substantial differences in the distribution of durations of unemployment spells for UI recipients versus nonrecipients. Large positive jumps in both the recall rate and the rate of finding a new job are apparent around the point of exhaustion of UI benefits. The results indicate that the potential duration of UI benefits plays an important role in the timing of recalls and of new job acceptances.

Savings and Bequests

Michael D. Hurd

Working Paper No. 1826

January 1986

JEL Nos. 918, 921

Empirical studies indicate that the elderly seem to accumulate wealth after retirement, and that the desire to leave bequests is an important determinant of saving behavior. Both kinds of results have cast doubt on the validity of the life-cycle hypothesis of consumption. In the first part of this paper, I specify a model of bequests and derive the implications for consumption and wealth trajectories. The main result is that, even

without a bequest motive, consumption generally decreases with age after retirement. Wealth will also decrease for all but wealthy households. In the empirical part of the paper, I report wealth changes of retired households over 10 years of panel data. Contrary to many results from cross-section data, the elderly do dissave: over 10 years, the real wealth of the elderly in the sample decreases by about 27 percent. I propose a test for a bequest motive but find no evidence whatsoever for such a motive.

The Contribution of Intergenerational Transfers to Total Wealth: A Reply

Laurence J. Kotlikoff and Lawrence H. Summers

Working Paper No. 1827

February 1986

JEL No. 313

This paper is a response to Franco Modigliani's recent critique of our 1981 study of the importance of intergenerational transfers for U.S. savings. Modigliani's paper is the latest salvo in a long-running debate over the importance of intergenerational transfers in explaining saving behavior. Modigliani corrects an algebraic error of minor consequence in our earlier paper but, in our view, its correction does not call into question the fundamental conclusion that life-cycle considerations can account for only a small part of aggregate capital accumulation. Modigliani's attacks seem to us incorrect in most cases. Generally, he fails to address our primary method of determining the importance of intergenerational transfers. Many other considerations suggest that our method produces an overestimate of the importance of life-cycle wealth.

The Term Structure of Interest Rates: Evidence and Theory

Angelo Melino

Working Paper No. 1828

February 1986

JEL No. 313

The term structure of interest rates is an old topic. Over the years, both the hypotheses debated and the research techniques used have changed considerably. Two fairly recent developments that distinguish current research are the widespread adoption of rational expectations and the integration of the term structure with the general theory of asset pricing. This survey reviews previous work from this perspective. The main objective is to catalog available evidence about term premiums and to interpret this evidence in light of alternative models of determination of term premiums.

The "Youth Problem": Age or Generational Crowding?

David E. Bloom and Richard B. Freeman
Working Paper No. 1829
February 1986

This paper attempts to distinguish between two alternative views of the labor market problems faced by young workers in a number of industrialized countries in the 1970s and early 1980s. The first view is that the low relative earnings and high unemployment rates experienced by these workers were largely related to age. Although this view carries the implication that the problems will disappear for recent youth cohorts as they grow older, it also implies that the problems will be handed over to successive waves of youth cohorts as they enter the labor market. The second view is that the labor market problems of recent youth cohorts are a consequence of their size. This view has very different implications, since generational crowding can permanently or temporarily depress the economic position of large cohorts but need not have an adverse effect on later waves of smaller youth cohorts.

On the basis of a multicountry empirical analysis of patterns of cohort size, earnings, unemployment, and the distribution of young workers across industries, we report four main sets of findings. First, the baby boom was not uniformly experienced across OECD economies, either in terms of its timing or its magnitude. While some countries, such as Canada, the United States, and Belgium, had large increases in the share of youth in the population from 1965 to 1980, others, notably Japan and Switzerland, had large decreases.

Second, our empirical results indicate that large cohort size tends to have a negative effect on the expected relative earnings of the cohort, where expected relative earnings is defined as the product of the earnings and the employment-to-labor-force ratio of a young cohort relative to the same product for an older cohort. There is, moreover, a marked trade-off between the relative earnings effect and the relative employment effect, with large cohort sizes reducing relative earnings in some countries and reducing relative employment in others.

Third, at least for the United States, the relatively low wages and high unemployment of the "unlucky cohorts" tend to converge to the patterns that would have resulted had the cohorts been more normal in size, with the convergence occurring within a decade or so.

Fourth, our results show that baby-boom cohorts were absorbed in the United States and other OECD economies quite evenly across a wide range of industries. This finding contradicts the popular belief that large youth cohorts were absorbed primarily through expansion of those industries that have been traditionally youth-intensive.

High Unemployment in Europe: Diagnosis and Policy Implications

Jeffrey D. Sachs
Working Paper No. 1830
February 1986
JEL Nos. 130, 133, 134

Econometric evidence suggests that the nonaccelerating inflation rate of unemployment (the NAIRU) has risen sharply in Europe in the past 15 years. In the first section of this paper, I review the recent proliferation of supply-side models that say interesting things about why the NAIRU has increased so substantially in Europe. In the second section of the paper, I use a simple example to show how aggregate demand should be managed optimally in response to transitory and permanent supply shocks, especially those shocks that cause a persistent rise in the NAIRU. Also, I discuss some policy implications of the increasingly popular "hysteresis" hypothesis, that the NAIRU itself is influenced by the time path of actual unemployment.

Intertemporal Labor Supply and Long-Term Employment Contracts

John M. Abowd and David Card
Working Paper No. 1831
February 1986
JEL Nos. 824, 131

In this paper we compare the implications of a symmetric information-contracting model and a dynamic labor supply model for changes in individual earnings and hours over time. The critical distinction between these models is whether earnings represent optimal consumption or payment for current labor services. We develop a simple test between labor supply and contracting models based on the relative variability of earnings and hours with respect to changes in productivity. If earnings represent consumption, then changes in productivity generate smaller changes in earnings than hours. The opposite is true in the labor supply model. We apply our test to longitudinal data on male household heads from the Panel Study of Income Dynamics and the National Longitudinal Survey of Older Men, focusing on individuals who do not change employers during the survey period. Neither model fits the data well. In both surveys, however, the contribution of changes in productivity to changes in earnings is greater than the contribution to changes in hours. The data are more consistent with a labor supply interpretation, although the estimated labor supply elasticities suggest that changes in hours occur at fixed wage rates.

On the Covariance Structure of Earnings and Hours Changes

John M. Abowd and David Card

Working Paper No. 1832

February 1986

JEL Nos. 824, 211, 131

This paper presents an empirical analysis of changes in individual earnings and hours over time. Using longitudinal data from three panel surveys, we catalog the main features of the covariance structure of changes in earnings and hours. We then present an interpretation of these features in terms of both a life-cycle labor supply model and a fixed-wage labor contract model. Our major findings are: (1) there is a remarkable similarity in the covariance structure of earnings and hours changes across the three surveys; and (2) apart from simple measurement error, the major component of variance in earnings and hours affects earnings and hours equiproportionately.

Dividend Innovations and Stock Price Volatility

Kenneth D. West

Working Paper No. 1833

February 1986

JEL Nos. 132, 212, 520

This paper establishes an inequality that may be used to test the null hypothesis that a stock price equals the expected present discounted value of its dividend stream, with a constant discount rate. The inequality states that if this hypothesis is true, the variance of the innovation in the stock price is bounded by a certain function of the variance in the innovation in the dividend. The bound is valid even if prices and dividends are nonstationary.

I use the inequality to test the null hypothesis for some long-term annual U.S. stock price data. The null is decisively rejected, with the stock price innovation variance exceeding its theoretical upper bound by a factor of as much as 20. The rejection is highly significant statistically. Regression diagnostics and some informal analysis suggest that the results are more consistent with speculative bubbles in the U.S. stock market than with a failure of the rational expectations or constant discount rate hypothesis.

The Welfare Implications of Costly Litigation in the Theory of Liability

A. Mitchell Polinsky and Daniel L. Rubinfeld

Working Paper No. 1834

February 1986

One of the principal results in the economic theory of liability is that, assuming litigation is costless, the

rule of strict liability with compensatory damages leads the injurer to choose the socially appropriate level of care. This paper reexamines this result when litigation is costly. It shows that strict liability with compensatory damages generally leads to a socially inappropriate level of care and to excessive litigation costs. Social welfare can be increased by adjusting compensatory damages upward or downward, with the desired direction depending on the effect of changes in the level of liability on the injurer's decision to take care and the victim's decision to bring suit.

Targeting Nominal Income: A Note

Kenneth D. West

Working Paper No. 1835

February 1986

This paper compares nominal income and monetary targets in a standard aggregate demand-aggregate supply framework. If the desirability of policies is measured by their effect on the unconditional variance of output, nominal income targeting is preferable if and only if the aggregate elasticity of demand for real balances is greater than one. This is precisely the opposite of the condition that in Bean (1984) is sufficient to make nominal income targeting preferable. This points out the importance of specification of supply and of objective function in work on nominal income targeting.

Macroeconomic Responses by Developing Countries to Changes in External Economic Conditions

Willem H. Buiter

Working Paper No. 1836

February 1986

JEL Nos. 130, 430

This paper presents a nontechnical survey of some of the issues involved in the design of stabilization policy in developing countries with special emphasis on policy responses to external shocks. First, I review the six most important economic parameters of developing countries: (1) the terms of trade; (2) the growth of world markets; (3) the cost and availability of private external finance; (4) the cost and availability of official and other concessional finance, including aid; (5) the world rate of inflation; and (6) the exchange rates among the currencies of the major industrial countries.

The paper then reviews the macroeconomic policy arsenal and the demand and supply effects of the various policy instruments (monetary and credit policy,

the entire array of fiscal instruments, exchange rate policy, the use of exchange and capital controls and incomes policy). Finally, I discuss stabilization responses to four external shocks: a deterioration in the terms of trade, a slowdown in the rate of growth of export demand, an increase in the interest rate at which developing countries borrow abroad, and an increase in the external rate of inflation. The prevalence of repressed financial markets and credit rationing makes effective demand and effective supply responses to monetary, fiscal, and exchange rate policy quite different from what they are in most of the industrial world.

Population Growth, Labor Supply, and Employment in Developing Countries

David E. Bloom and **Richard B. Freeman**

Working Paper No. 1837

February 1986

JEL No. 826

The economies of less developed countries are about to face perhaps the greatest challenge in their histories: generating a sufficient number of jobs at reasonable wages to absorb their rapidly growing populations into productive employment. In terms of absolute magnitude, this challenge has no precedent in human history. In some respects, the nature of this challenge is also unprecedented, given the limited availability of natural resources in many countries on the one hand, and the widespread availability of advanced technology on the other hand.

This paper examines the nature and magnitude of the principal effects of population growth on labor supply and employment in the developing economies of the world. We discuss key features of the interrelationships between population growth and the labor force on the supply side of labor markets. These include the lags between population growth and labor force participation; the independent effects on labor supply of accelerated population growth resulting from changes in fertility, mortality, and migration; patterns and trends in labor force participation rates; and gender differences in labor supply behavior. We also describe and analyze the nature of labor markets in developing economies and attempt to identify the key factors that condition their labor absorption capacity, on the demand side.

Finally, we present and discuss descriptive statistics of labor markets in developing countries and on the relationships among population growth, labor supply, employment shifts, and growth of output per worker.

The key result of our analysis is that, despite the unprecedented magnitude of population growth and the existence of imperfections in labor markets, developing economies tended to shift from low-productivity agriculture to the higher-productivity service and industrial sectors between 1960 and 1980. Moreover, albeit with

some exceptions, they tended to raise real income per capita.

With respect to their prospects for the remainder of this century, we conclude that Malthusian disasters will not necessarily result from the forecast population growth, if the developing economies can generate investments in human and physical capital of comparable relative magnitudes to those of the past two decades. However, based on history, the middle-income developing countries are likely to perform better in this respect than the low-income countries, some of whom may need considerable help if they are to absorb increased population while shifting labor to more productive sectors and raising output per worker.

Elections and Macroeconomic Policy Cycles

Kenneth Rogoff and **Anne Sibert**

Working Paper No. 1838

February 1986

JEL No. 023

There is an extensive empirical literature on political business cycles, but its theoretical foundations are grounded in macroeconomic theory that preceded rational expectations theory. Here we show that electoral cycles in taxes, government spending, and money growth can be modeled as an equilibrium signaling process. The cycle is driven by temporary information asymmetries that can arise if, for example, the government has more current information on its performance in providing for national defense. Incumbents cheat least when their private information is extremely favorable or extremely unfavorable. An exogenous increase in the incumbent party's popularity does not necessarily imply a damped policy cycle.

Plant Closings, Labor Demand, and the Value of the Firm

Daniel S. Hamermesh

Working Paper No. 1839

February 1986

JEL Nos. 820, 020

This study postulates an internal labor market in which workers accumulate firm-specific human capital that raises the value of the firm and insulates it, to some extent, from the vagaries of product demand that might result in its closing. Negative product-market shocks reduce wage growth and increase the probability of the firm closing. The model also predicts a U-shaped relationship between the probability of the plant closing and the length of a worker's tenure, a proxy for firm-specific human investment.

Data from the Panel Study of Income Dynamics for 1977 through 1981 are used to produce weighted-probit estimates of the parameters of an equation describing the probability of displacement. The results support

most of the predictions of the model, but similarly specified equations describing the probability of permanent layoff indicate that a theory of plant closings must differ from that of layoffs. I use parameter estimates to infer an analogue to the firm's elasticity of demand for labor and to deduce the wage reduction necessary to avoid an increase in the probability of a plant closing when a negative demand shock occurs.

Why Have Unemployment Rates in Canada and the United States Diverged?

Orley Ashenfelter and David Card

Working Paper No. 1840

February 1986

Throughout the postwar period, U.S. and Canadian unemployment rates moved in tandem, but this historical link apparently ended in 1982. During the past three years, Canadian unemployment rates have been some three percentage points higher than their U.S. analogues, and this gap shows no sign of diminishing. This paper is an empirical evaluation of a variety of explanations for this new unemployment gap.

We first show that the demographic and industrial composition of the two countries is remarkably similar, so that no simple mechanical hypothesis can explain the basic puzzle. It is also evident that the increase in Canadian unemployment relative to U.S. unemployment cannot be fully attributed to output movements. We find that the gap between actual and predicted Canadian output, based on U.S. output, has fallen dramatically since 1982 while the unemployment gap has widened. We also find that unemployment in Canada was two to three percentage points higher in 1983 and 1984 than predicted by Canadian output.

We have investigated a variety of hypotheses to explain the slow growth of employment in Canada after 1982. These hypotheses attribute the slow growth of employment to rigidities in the labor market that raise employers' costs and restrict the flow of workers between sectors. The evidence does not support the notion that the growth in relative unemployment in Canada is caused by differences in the regulation of the labor market in the two countries. Minimum wage laws and unemployment benefits are fairly similar in Canada and the United States, and neither has changed relative to the other in the last decade. Unionization rates have increased in Canada relative to the United States since 1970. Most of this divergence occurred before 1980, however, and does not seem to have created an unemployment gap prior to 1980. Finally, the hypothesis that differential real wage rates are a major determinant of relative employment in the United States and Canada is soundly rejected by the data. Real wage rates have been essentially uncorrelated with employment movements within each country and between the two countries.

Empirical Models of Arbitrator Behavior under Conventional Arbitration

David E. Bloom

Working Paper No. 1841

February 1986

JEL No. 833

This study analyzes a new set of data on the decisions of conventional arbitrators. The main goal is to infer the extent to which conventional arbitration decisions are fashioned as mechanical compromises of the parties' final offers, without reference to the exogenous facts involved in different disputes. The results of the analysis are remarkably clear: conventional arbitrators tend to split the difference between the parties' final offers with virtually no evidence of systematic reference to the facts of the cases. However, since there is a substantial amount of unexplained variance in the arbitration decisions, this evidence of mechanical compromise behavior should be viewed as characterizing the overall operation of conventional arbitration mechanisms and not the behavior of individual arbitrators in any particular case. Indeed, the results are consistent with the view that individual arbitrators pay close attention to the facts of the cases, but that there is considerable variation in the structure of different arbitrators' preference functions.

Alternative Explanations of the Money-Income Correlation

Ben S. Bernanke

Working Paper No. 1842

February 1986

JEL No. 310

Standard explanations of the bivariate correlation of money and income attribute it to an inability of agents to discriminate in the short run between real and nominal sources of price shocks. This paper is an empirical comparison of the standard explanation with two alternatives: (1) the "credit view," which focuses on financial market imperfections rather than real-nominal confusion; and (2) the real business cycle approach, which argues that the money-income correlation reflects a passive response of money to income. The methodology, which is a variant of the Sims vector autoregression (VAR) approach, follows Blanchard and Watson (1984) in using an estimated, explicitly structural model to orthogonalize the VAR residuals. (This variant methodology, I argue, is the more appropriate for structural hypothesis testing.) The results suggest that the standard explanations of the money-income relationship are largely, but perhaps not completely, displaced by the alternatives.

Content Protection and Oligopolistic Interactions

Kala Krishna and Motoshige Itoh
Working Paper No. 1843
February 1986
JEL No. 420

In oligopolistic situations, current protection can have unexpected effects because it changes the nature of interactions between input suppliers. In a duopoly, content protection makes the foreign firm wish to match price increases and decreases of the domestic firm. Domestic input suppliers can therefore lose from such policies, even when set at free trade levels. The relationships among input demands, the form of protection, and the degree of substitution between inputs define the effects of content protection and provide the basis for understanding who might lobby for protection in different environments.

Borrowing to Defend the Exchange Rate and the Timing and Magnitude of Speculative Attacks

Willem H. Buiter
Working Paper No. 1844
February 1986
JEL No. 431

This paper extends the recent literature on managed exchange rate regimes that collapse; it allows explicitly for the government budget constraint and the interest cost of servicing the public debt. The policy experiment I analyze is the decision by a government to replenish its stock of foreign exchange reserves through a once-off sale of bonds in the open market. Without a fundamental fiscal correction (that is, a decision to reduce the primary—noninterest—deficit by an amount equal to the increase in the interest cost of servicing the debt), there are certain consequences. In a deterministic model, the timing of the speculative attack is brought forward (delayed) if the borrowing takes place long before (close to) the date at which the collapse would have occurred without borrowing. The magnitude of the attack (the final loss of reserves) always increases because of borrowing. In a stochastic model, borrowing reduces the probability of an early collapse and increases the likelihood of a collapse later. Under mild conditions, the expected time until the collapse occurs increases because of borrowing.

Seasonal Fluctuations and the Life Cycle-Permanent Income Model of Consumption

Jeffrey A. Miron
Working Paper No. 1845
February 1986
JEL No. 210

Recent empirical work has found that both aggregate and micro data reject the rational expectations version of the Life Cycle-Permanent Income model of consumption. This paper examines a new possible explanation for the rejections: the treatment of seasonal fluctuations. There are substantial seasonal fluctuations in consumption purchases, but no previous paper has determined whether these fluctuations are consistent with the Life Cycle-Permanent Income model. The results in this paper show that when the seasonal fluctuations in consumption purchases are included in an analysis of the Life Cycle-Permanent Income model, there is no evidence in the aggregate data against the model. The estimates of the parameters of agents' utility functions obtained here are plausible, and the data do not reject the overidentifying restrictions on the model.

Detrebling versus Decoupling Antitrust Damages: Lessons from the Theory of Enforcement

A. Mitchell Polinsky
Working Paper No. 1846
February 1986

This paper compares two systems of private antitrust enforcement. In one (referred to as the "damage multiplier approach"), the plaintiff receives what the defendant pays; in the other (the "decoupling approach"), this constraint is not imposed. Reducing treble damages to single damages ("detrebling") would be an example of the first approach. Making the defendant pay treble damages, while giving the plaintiff only single damages, would be an example of the second approach. Using the principles of the economic theory of enforcement, I show that the decoupling approach is preferable to the damage multiplier approach; the optimal system of decoupling could award the plaintiff more or less than what the defendant pays. However, several additional issues need to be considered before decoupling can be recommended in practice.

The Impact of Deregulation on the Employment and Wages of Airline Mechanics

David Card

Working Paper No. 1847
February 1986

This paper describes the effects of deregulation on negotiated wage rates and employment levels among airline mechanics in the (scheduled) airline industry. Firm-specific data for the incumbent trunk airlines show relatively small changes in real wage rates since deregulation. Increases in interfirm wage differentials have occurred only recently. Employment growth rates, on the one hand, have varied widely among the incumbents, and between the incumbent trunks and the local service and new-entrant airlines. The data suggest that deregulation resulted in a transfer of 5000-7000 maintenance jobs from the incumbent trunks to the smaller airlines. This shift in employment reduced mechanics' earnings in the industry by as much as 5 percent.

Productivity Growth and Changes in the Terms of Trade in Japan and the United States

Catherine G. Morrison and W. Erwin Diewert

Working Paper No. 1848
March 1986
JEL Nos. 410, 620

In this paper, we use a recently proposed procedure (Diewert and Morrison [1985]) to adjust real domestic product and productivity for changes in a country's terms of trade. We apply this procedure to a comparison of two major industrialized countries: the United States and Japan. The approach is based on assessing the impact of changes in terms of trade and the balance of payments deficit on production or final sales to domestic purchasers. This treatment of international trade allows for comparative statics analysis based on production theory only. We carry out the comparison for a relatively open economy (Japan) with an economy that may not be as vulnerable to changes in the terms of trade (the United States) for 1967 to 1982.

The Extent and Sources of Cost and Efficiency Differences between U.S. and Japanese Automobile Producers

Melvyn A. Fuss and Leonard Waverman

Working Paper No. 1849
March 1986
JEL No. 631

This paper presents estimates of cost and efficiency differences between U.S. and Japanese producers

that for the first time are based on an econometric cost function methodology rather than the accounting frameworks previously used. We demonstrate that the cost difference estimates for 1979 that were influential in the debate resulting in the Voluntary Restraints Agreements of 1981-85 substantially overestimated the Japanese advantage. While our estimate of the Japanese cost advantage for 1980 is similar to previous estimates, we attribute most of this advantage to short-run phenomena: underutilization of U.S. production capacity and an undervalued yen. In a previous paper, we showed that the Japanese growth rate of total factor productivity was much faster than the U.S. rate during the 1970s. However, we estimate the long-run underlying Japanese advantage in efficiency as of 1980 to have been only 1-2 percent—much less than previously estimated. This is because Japan began the 1970s with a long-run efficiency disadvantage of over 2 percent, and the decade of the 1970s represented a catchup period for Japanese producers.

Comparison and Analysis of Productivity Growth and R and D Investment in the Electrical Machinery Industries of the United States and Japan

M. Ishaq Nadiri and Ingmar R. Prucha

Working Paper No. 1850
March 1986
JEL Nos. 226, 621

This paper presents a comparative analysis of productivity growth in the U.S. and Japanese electrical machinery industries in the postwar period. This industry has experienced rapid growth in output and productivity and high rates of capital formation in both countries. A substantial amount of R and D resources of the total manufacturing sectors in both countries is concentrated in the electrical machinery industry. Also, this industry has an active export orientation in both countries.

The analysis of the paper is based on dynamic factor demand models that describe the production structure and the behavior of factor inputs as well as the determinants of productivity growth in the U.S. and Japanese electrical machinery industry. The analysis shows that the production structure of the industry in both countries is characterized by increasing returns to scale; the factors of production do respond to changes in factor prices; and there is a pattern of substitution and complementarity among the inputs. The main sources of productivity growth are: growth in materials; technical change; and capital accumulation. R and D expenditures have also contributed significantly to growth of labor and productivity while the most important source of total factor productivity in this industry for both countries has been the scale effect followed by changes in technical progress.

Survey Evidence on Diffusion of Interest among Institutional Investors

Robert J. Shiller and John Pound

Working Paper No. 1851

March 1986

JEL Nos. 310, 313

This paper proposes "contagion" or "epidemic" models of financial markets in which interest in or attention to individual stocks is spread by word of mouth. The models give alternative interpretations of the random walk character of stock prices. To ascertain the relevance of such models, we distributed a questionnaire survey to institutional investors. The questions elicited the fraction of these investors who were unsystematic and allowed themselves to be influenced by word-of-mouth communications or other salient stimuli. We then produced rough estimates of the infection rate and the removal rate. Finally, we compared a control group of investors with investors in stocks whose price had recently increased dramatically to a high price/earnings ratio.

Effects of Alcoholic Beverage Prices and Legal Drinking Ages on Youth Alcohol Use

Douglas Coate and Michael Grossman

Working Paper No. 1852

March 1986

JEL No. 913

Based on an analysis of the second National Health and Nutrition Examination Survey, which was conducted between 1976 and 1980, we find that the frequency of drinking beer, the most popular alcoholic beverage among youths, is inversely related to the real price of beer and to the minimum legal age for its purchase and consumption. Furthermore, the negative effects of price and legal drinking age are by no means limited to reductions in the fraction of youths who drink beer infrequently (less than once a week). Instead, when price or drinking age rises, the numbers of youths who drink beer fairly frequently (1-3 times a week) and frequently (4-7 times a week) fall more in absolute or percentage terms than the number of infrequent drinkers.

These findings are striking because frequent and fairly frequent drinkers are likely to be responsible for a large percentage of motor vehicle accidents and deaths among youths. Our simulations suggest that a uniform drinking age of 21 and an increase in the federal excise tax rate on beer might be effective policies to reduce youth alcohol use and abuse. We also find that the tax policy may be more potent than the drinking age policy.

News from the United States and Japan: Which Moves the Yen/Dollar Exchange Rate?

Takatoshi Ito and V. Vance Roley

Working Paper No. 1853

March 1986

We examined intradaily movements in the yen/dollar exchange rate in four nonoverlapping segments within each business day between January 1980 and September 1985 and reached several conclusions. First, most depreciation of the yen (appreciation of the dollar) from late 1982 to early 1984 occurred in the New York market; the yen remained mostly neutral in the Tokyo market. Also, the volatility of the exchange rate decreased considerably in the Tokyo market. The volatility in the New York market, on the other hand, did not decrease until very recently.

Second, we examined market efficiency in terms of the random walk behavior of short-run movements in the yen/dollar rate. Information on the preceding segments within a day was sometimes significant in predicting the exchange rate movement in a market.

Third, there is evidence of the profit-taking behavior, or overshooting, in that a large jump (more than three absolute yen) in any market tends to be reversed by one-fifth of the jump during the same day in the next market. Finally, we explicitly examined the relative effects of news from the United States and Japan both with respect to possible major events behind large jumps and to the response of the yen/dollar rate to particular economic announcements in both countries. Over the entire sample period, news concerning the U.S. money stock had the only significant effects.

The Dollar as a Speculative Bubble: A Tale of Fundamentalists and Chartists

Jeffrey A. Frankel and Kenneth A. Froot

Working Paper No. 1854

March 1986

JEL No. 431

Several recent developments have inspired us to consider a nonstandard model of the dollar as a speculative bubble *without* the constraint of fully rational expectations: (1) the dollar continued to rise in 1984 after real interest rate differentials and other fundamentals began moving the wrong way; (2) the results of market efficiency tests imply that the rationally expected rate of dollar depreciation has been less than the forward discount; (3) Krugman-Marris current account calculations suggest that the rationally expected rate of depreciation is *greater* than the forward discount; (4) survey data show an expected rate of depreciation that is also greater than the forward discount; and (5) the hypothesis of a "safe-haven" shift into U.S.

assets and a decrease in the U.S. risk premium, which could explain some of the foregoing, is contradicted by a decline in the differential between offshore interest rates (covered) and U.S. interest rates.

Our model features three classes of actors: fundamentalists, chartists, and portfolio managers. Fundamentalists forecast a depreciation of the dollar based on an overshooting model that would be rational if there were no chartists. Chartists extrapolate recent trends based on an information set that includes no fundamentals. Portfolio managers take positions in the market and thus determine the exchange rate, based on expectations that are a weighted average of the positions of the fundamentalists and chartists. The first stage of the dollar appreciation after 1980 is explained by increases in real interest differentials. The second stage is explained by the endogenous takeoff of a speculative bubble when the fundamentalists have misforecast for so long that they have lost credibility. In 1985, the dollar may have entered a third stage in which an ever-worsening current account deficit begins a reversal of the bubble.

Taxes and the Merger Decision: An Empirical Analysis

Alan J. Auerbach and David Reishus

Working Paper No. 1855

March 1986

One motive often cited for merger activity is the avoidance of federal income taxes by corporations and their shareholders. Yet there is little empirical evidence on the tax consequences of merger activity, nor on the postmerger effects on firm policies of tax-motivated mergers.

In this paper, we present some initial results based on a large sample of mergers and acquisitions that occurred over 1968-83. We find that in about one-fifth of all mergers there was a potential gain from the transfer of unused tax losses and credits, with an average value of approximately 10 percent of the acquired company's market value. Other tax incentives to merge also are measured but found to be less important quantitatively.

Wages, Employment, and the Threat of Collective Action by Workers

William T. Dickens

Working Paper No. 1856

March 1986

JEL Nos. 821, 832

For many reasons, a group of workers may have sufficient bargaining power to claim for themselves some

share of any monopoly surplus earned by an enterprise and (in the short run) a share of the return on fixed assets. This paper explores the effect of the threat of collective action on wages and employment in firms that wish to avoid collective bargaining with their employees.

The threat of collective action analyzed here is a stylized representation of the institutional situation created by U.S. labor laws. If a firm wishes to avoid collective bargaining, it must choose wages and employment so that no coalition greater than or equal to a fixed fraction of its work force can be formed around a feasible bargaining arrangement. I analyze this implicit constraint on employment and wages for several assumptions about how bargained surplus is distributed among workers. I find that the threat may affect only employment, or both wages and employment. For a firm with monopoly power, a threat may either increase or decrease employment. Effects on wages and employment are possible even in a market with price competition and free entry if firms must make fixed investments to produce output. Even when union contracts are efficient, a threat of collective action can be expected to distort employment and investment decisions.

If a threat causes firms to pay a wage above the reservation wage, then there will be an excess supply of labor to the firm. Under certain conditions, this may manifest itself as involuntary unemployment. Further, unemployed workers will be unable to bid wages down. Like efficiency wage models, the threat of collective action provides an explanation for industry wage differences and for the dual structure of the labor market. The model may also provide some insight into the reasons for the stability of nominal and real wages over the business cycle.

The Effects of Tax Rules on Nonresidential Fixed Investment: Some Preliminary Evidence from the 1980s

Martin Feldstein and Joosung Jun

Working Paper No. 1857

March 1986

The evidence presented in this study confirms that tax-induced changes in the profitability of investment have had a powerful effect on the share of GNP devoted to nonresidential fixed investment. More specifically, we have reestimated two models of aggregate investment initially presented in Feldstein, "Inflation, Tax Rules, and Investment: Some Econometric Evidence" (*Econometrica*, 1982).

This study extends the previous analysis by using revised national income accounts, by improving the estimation of the effective tax rate and the profitability of new investments, and by extending the sample to

include 1978–84. Despite these changes, the new statistical estimates are remarkably close to the previous results. The statistical estimates are also very robust with respect to sample period, estimation method, and the presence of other variables.

The first model relates the investment–GNP ratio to the real net-of-tax rate of return received by the providers of debt and equity capital to the nonfinancial corporate sector and to the rate of capacity utilization. Our estimates imply that each percentage point of increase in the real net return raises the investment–GNP ratio by 0.4 percentage points. A one percentage point increase in the net return is equivalent to a ten percentage point reduction in the overall effective tax rate. Since the net nonresidential fixed investment averaged 3 percent of GNP during the past three decades, a ten percentage point tax reduction induces a 13 percent rise in the investment–GNP ratio.

Our second model relates the investment–GNP ratio to the difference between the maximum potential net return that firms can support by investing in a “standard investment project” and the net cost of debt and equity capital. The statistical estimates imply that each percentage point of change in this measure of the rate of return over cost raises the investment–GNP ratio by 0.3 percentage points or 10 percent of its three-decade average.

The estimates imply that the 1985 tax bill passed by the House of Representatives would reduce the investment–GNP ratio by between 10 percent and 15 percent of its average value, depending on the model used to make the calculation. Such reductions would represent between one-half and three-fourths of the rise in the investment–GNP ratio since the 1981 investment incentives were adopted.

U.S. Monetary Policy Regimes and U.S.–Japan Financial Relationships

V. Vance Roley

Working Paper No. 1858

March 1986

JEL No. 431

This paper examines the pervasiveness of the effects of shifts in U.S. monetary policy regimes and unanticipated changes in money on international financial markets. I examine four potential regimes from October 1977 to May 1985 in terms of the response of yen-denominated securities in the Tokyo market to U.S. money surprises. I further examine the rationality of the responses in domestic and foreign onshore financial markets by testing whether the responses of dollar-denominated securities, yen-denominated securities, the spot yen/dollar exchange rate, and the forward yen/dollar exchange rate violate covered interest parity. The use of yen-denominated assets and the yen/dollar

exchange rate allows further tests of the effects on market efficiency of the liberalization of restrictions on capital mobility in Japan since the late 1970s.

Search Method Use by Unemployed Youth

Harry J. Holzer

Working Paper No. 1859

March 1986

JEL No. 820

In this paper I investigate the use of different search methods by unemployed youth. I present a job search model that shows that the choice of search method should be related to cost and expected productivity, as well as to other factors such as nonwage income and wage offer distributions.

I then present empirical evidence on the use of these methods and their effects on employment outcomes. These results show that the most frequently used search methods—friends and relatives or direct applications without referral—are also the most productive in generating job offers and acceptances. Econometric evidence then shows that the number of methods used is affected by factors that presumably reflect market opportunities as well as income sources and needs. While the use of specific search methods responds differently to these factors, they are chosen in a manner that generates positive average effects on employment outcomes for those who use them. The results are thus consistent with the search model presented in this paper.

Informal Job Search and Black Youth Unemployment

Harry J. Holzer

Working Paper No. 1860

March 1986

JEL No. 820

In this paper I analyze how young black and white unemployed jobseekers use various methods of search and the employment outcomes of each method. I focus on distinguishing informal search methods (that is, friends and relatives or direct application without referral) from more formal ones in analyzing racial differences.

The results show that the two informal methods of search account for about 90 percent of the difference in employment probabilities between white and black youth. This also accounts for 57–71 percent of the difference in unemployment rates between the two. Furthermore, most of these results reflect differences in the ability of these methods to generate job offers, as opposed to differences in search effort or job acceptance rates. However, my ability to explain these differences through personal, family, and household characteristics was generally quite limited.

Employed and Unemployed Job Search: A Comparison of Choices and Outcomes among Youth

Harry J. Holzer

Working Paper No. 1861

March 1986

JEL No. 820

This paper presents evidence that young unemployed jobseekers choose higher levels of search effort (as measured by numbers of methods used and time spent per method) and lower relative reservation wages than do comparable employed seekers. The unemployed also have higher probabilities of gaining new employment, reflecting higher probabilities of receiving offers and, especially, higher probabilities of accepting them. The unemployed are also more likely to accept slightly lower wages than the employed jobseekers. These differences in outcomes between the two groups are at least partly explained by differences in their respective search choices. The evidence thus suggests that unemployed jobseekers have higher costs of search (from foregone earnings) than do the employed, causing the former to seek new jobs more eagerly.

New Results on the Effects of Tax Policy on the International Location of Investment

Michael J. Boskin and William G. Gale

Working Paper No. 1862

March 1986

JEL No. 323

We study the effects of tax laws on foreign direct investment (FDI) and direct investment abroad (DIA), in each case distinguishing between investment financed by retained earnings and investment financed by transfers from abroad. We find that tax policy, through its effect on the rate of return available in the United States, has an important effect on the international location of investment. FDI in the United States is very sensitive to aftertax rates of return available here. U.S. DIA is also affected, although to a lesser extent.

We use these estimates to examine the effects of the 1981-82 tax changes on the international location of investment. We estimate that the tax changes lowered annual DIA by \$0.5 billion to \$1.0 billion (2 percent to 4 percent of its 1980 value), and raised annual FDI by \$2 billion to \$4 billion (11 percent to 20 percent of its 1980 value). We also discuss the welfare effects of tax policy toward international investment.

Our results suggest that the tax effects on the international location of investment are important. Tax policies, such as ACRS and the ITC, which raise the after-tax rate of return on new investment without losing revenue from previous investment, not only stimulate

domestic fixed investment but also attract additional investment from abroad. The additional investment supplements the domestic investment impact on productivity and raises corporate tax revenue. However, our results should be taken as preliminary estimates, not as definitive statements about the long-run impacts of tax policy.

Tax Loss Carryforwards and Corporate Tax Incentives

Alan J. Auerbach and James M. Poterba

Working Paper No. 1863

March 1986

JEL Nos. 320, 520

This paper investigates the extent to which loss-offset constraints affect corporate tax incentives. Using data gathered from corporate annual reports, we estimate that 15 percent of the firms in the nonfinancial corporate sector had tax loss carryforwards in 1984. When weighted by their market value, however, these firms account for less than 3 percent of this sector, suggesting that loss carryforwards are concentrated among small firms and affect relatively few large corporations. For those firms with loss carryforwards, however, the incentive effects of the corporate income tax may differ significantly from those facing taxable firms. We demonstrate this by calculating the effective tax rates on equipment and structures for both types of firms. Our results suggest that firms that are currently taxable have a substantially greater incentive for equipment investment than firms with loss carryforwards, but that loss carryforwards have a relatively smaller effect on the tax incentive for investing in structures. Overall, firms with loss carryforwards receive a smaller investment stimulus than do taxable firms.

Tax Incidence

Laurence J. Kotlikoff and Lawrence H. Summers

Working Paper No. 1864

March 1986

This paper surveys major issues in the theory of tax incidence. These include the incidence of taxes in dynamic as well as static economies and in open as well as closed economies. The survey does not represent a comprehensive review of the literature. Rather, we offer it to the reader as a pedagogical piece that may be of use in teaching the theory of tax incidence.

International Borrowing to Finance Investment

Charles M. Engel and Kenneth Kletzer

Working Paper No. 1865

March 1986

JEL Nos. 441, 433, 431, 411

This paper studies the motives of a small country for borrowing to purchase capital equipment on international markets. The country produces tradable capital and a nontradable consumption good and borrows or lends capital to achieve higher levels of welfare. A shift in time preference that favors future over current consumption has an ambiguous impact on foreign debt. Whether the country lends or borrows immediately depends upon whether the consumption goods sector is capital- or labor-intensive. We also derive the dynamic behavior of the current account for a country that is initially capital-poor. Our results contrast with those of previous studies of optimal indebtedness in which consumables are borrowed directly.

Internal Nonprice Competition, Pricing, and Incentive Systems in the Cooperative Service Firm: Evidence from Medical Group Practice

Martin Gaynor

Working Paper No. 1866

March 1986

This paper develops a model of internal nonprice competition among members of a cooperative firm. Members take a price and income distribution as given but perceive a positive relationship between their own production of quality and the flow of consumers to them, when constrained by demand. At an internal Nash equilibrium, each member may be producing "too much" quality, yet will not reduce production for fear of losing customers. This paper focuses on the price and income distribution method, which serves as an incentive mechanism for coordinating behavior. An unusual feature of this model is the switching behavior generated as members of the firm move from the unconstrained to the constrained regime. I incorporate this feature for empirical testing by specifying the model to be estimated as a spline function. The empirical testing is possible because there is a unique data set for American medical group practice.

The estimation results of this study confirm the hypotheses of switching behavior and a positive relationship between price and the strength of the link between reward and productivity. This provides strong evidence to support the contention that internal nonprice competition is present in cooperative service firms, and that it increases as members' rewards are linked more closely with their own productivity.

Asset Price Volatility, Bubbles, and Process Switching

Robert P. Flood and Robert J. Hodrick

Working Paper No. 1867

March 1986

JEL No. 313

Evidence of excess volatilities of asset prices compared with those of market fundamentals is often attributed to speculative bubbles. This study examines the sense in which speculative bubbles could lead to excess volatility in theory, but it demonstrates that some of the evidence of variance bounds reported to date precludes bubbles as a reason why asset prices might violate such bounds. The findings must represent some other misspecification of the model or market inefficiency. One important misspecification occurs when the researcher incorrectly specifies the time-series properties of market fundamentals. A bubble-free example economy characterized by a potential switch in government policies produces paths of asset prices that would appear, to an unwary researcher, to contain bubbles.

The General Theory of Tax Avoidance

Joseph E. Stiglitz

Working Paper No. 1868

March 1986

JEL No. 022

This paper outlines a general set of principles for tax avoidance. Many of the most common tax avoidance schemes make use of one or more of these principles. I describe four such methods.

In a perfect capital market, these methods would enable the astute taxpayer to eliminate all taxation on capital income. The fact that the tax system raises revenue at all is attributed to the lack of taxpayer astuteness and/or lack of perfection in the capital market. Accordingly, models that attempt to analyze the effects of taxation assuming rational, maximizing taxpayers working within a perfect capital market may give misleading results.

A full analysis of tax avoidance cannot be conducted within a partial equilibrium model; transactions that reduce one individual's tax liability may increase another's at the same time. I delineate tax avoidance schemes that reduce the aggregate tax liabilities of the participants. Much of the "general equilibrium" gain from tax avoidance arises from differences in tax rates, both across individuals and across classes of income. This analysis has implications both for patterns of ownership of assets and for the timing of transfers.

Tariffs, Saving, and the Current Account

Charles M. Engel and Kenneth Kletzer

Working Paper No. 1869
March 1986
JEL Nos. 411, 431, 433, 441

We investigate the effects of higher tariffs on the current account. Tariffs may increase or decrease investment depending on the capital intensity of the sector protected. We find that the response of saving to tariffs is sensitive to the modeling of saving behavior. In a model in which consumers' discount rate varies endogenously (in the Uzawa preference form), saving falls with higher tariffs. However, this result may be reversed in the Blanchard-Yaari-type model in which consumers have uncertain lifetimes. We find that in both models the response of saving depends on a production distortion effect that changes steady-state income and on an effect on steady-state expenditures.

An Empirical Test of an Asymmetric Information Model of Strikes

Joseph S. Tracy

Working Paper No. 1870
March 1986

Recent developments in the theory of strategic bargaining demonstrate how informational asymmetries can lead to prolonged and costly bargaining. These models can be applied to contract negotiations between unions and firms, yielding an economic theory of strikes. To date, however, few empirical tests of these models have been carried out. This paper presents

some evidence supporting this view of strikes. I derive a set of predictions concerning the incidence and unconditional duration of strikes from a simple bargaining model in which the union is uncertain about the firm's future profitability. I then test these predictions on a micro data set of major U.S. contract negotiations that took place from 1973 to 1977.

How Burdensome Are Capital Gains Taxes?

James M. Poterba

Working Paper No. 1871
March 1986
JEL Nos. 320, 520

Several recent and provocative studies have described portfolio trading strategies that permit investors to avoid all taxes on capital gains and to shelter a substantial part of their ordinary income as well. Other studies adopt the more traditional view that the capital gains tax raises the effective tax burden on capital income. This paper uses data on capital gains realization from the 1982 IRS Individual Tax Model to distinguish between these views. It shows that for about one-fifth of the investors who realize gains or losses, the ordinary income loss-offset limitations are binding constraints. Since additional gain realizations do not affect these investors' current tax liability, they may be effectively untaxed on capital gains. Another significant group escapes taxation by not reporting realized gains. However, the largest group of investors trades in a less elaborate and more honest manner, realizing and reporting gains without offsetting losses. The capital gains tax may reduce the aftertax return earned by these investors.

Optimal Tariffs in Consistent Conjectural Variations Equilibrium

Stephen J. Turnovsky

Working Paper No. 1872
March 1986
JEL No. 422

This paper analyzes the determination of the optimal tariff under the assumption of Consistent Conjectural Variations (CCV). I present a general characterization of the CCV equilibrium. Then I show that: (1) there are, in general, a multiplicity of such equilibria; and (2) under certain restrictions, the Cournot equilibrium, which is based on the assumption of no retaliation, can also be a CCV equilibrium. By contrast, free trade is never a CCV equilibrium. Finally, I solve the CCV equilibrium explicitly in a simple example.

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