Lawrence Henry Summers is the 1993 recipient of the John Bates Clark Medal, an award presented by the American Economic Association every other year to an outstanding economist under the age of forty. Larry is an extraordinary research economist, as well as an active participant in economic policymaking, and to some degree a political figure. He served as a Staff Economist at the Council of Economic Advisers (1981–82), Chief Economist of the World Bank (1989–91), and is currently the Under-Secretary for International Affairs at the U.S. Treasury.

This paper summarizes Larry's important research contributions. The next four sections describe his work in the four fields of economics that were identified in the Clark Medal citation: public finance, labor economics, financial economics, and macroeconomics. Each section describes his substantive research contributions, and discusses novel aspects of his research strategy. The sheer quantity of Larry's published work has forced me to limit this survey to a fraction of his research, and I apologize at the outset to Larry, and his coauthors, for oversights or errors of omission. As is typical of papers of this


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sort in this journal, Larry’s papers that are referenced in this article are listed in chronological order in Table 1 and referred to by number in the text. All other references are by the author-date approach.

Public Finance and Capital Income Taxation

Larry’s long-lasting interest in public finance was sparked by his research interaction with Martin Feldstein. This began when Larry, an MIT undergraduate, worked as a summer research assistant for Feldstein, a Harvard professor, in 1974. They subsequently collaborated during Larry’s graduate school years at Harvard, and published two papers on taxation, inflation, and corporate profits. Larry’s doctoral dissertation (which was advised by Feldstein) and his first major publication were concerned with the economic analysis of capital income taxation. Feldstein’s approach to empirical economics played a critical role in shaping Larry’s research style, and its durable influence is clear in much of the research discussed below.

After Larry had accepted an assistant professorship at MIT, Feldstein and Summers published a joint paper [1] which showed that high inflation rates raised the total tax burden on corporate capital income to levels far above the statutory corporate tax rate. In some years, this tax burden exceeded 70 percent. This was due to three factors: the use of nominal rather than real values in computing tax depreciation deductions on corporate assets, the taxation of nominal rather than real profits on goods held in inventory, and the taxation of investors on nominal rather than real interest payments and capital gains.

Larry moved beyond simply documenting high effective tax rates to analyze how such taxes were likely to affect saving and capital formation. Although the argument that inflation raised tax burdens and depressed after-tax returns was widely accepted in the late 1970s, there was less agreement concerning the empirical link between after-tax returns and saving behavior. The prevailing wisdom held that saving was relatively insensitive to rates of return, since in the standard two-period Fisherian analysis, a reduction in the rate of return induces offsetting income and substitution effects. Michael Boskin (1978) had presented striking, if controversial, evidence to challenge this view, showing that lower after-tax interest rates significantly lowered U.S. private saving.

Larry was drawn to this controversy. He recognized that when analyzing capital income taxation, there was an important distinction between the stylized two-period model and more realistic multiperiod models. Since actual households live for many periods and expect to receive labor income in future periods, reductions in the after-tax rate of return raise the present discounted value of their future labor income. This positive human wealth effect raises current consumption, reinforcing the substitution effect that favors current over future consumption when rates of return decline.
Table 1

Forty Selected Papers by Lawrence H. Summers

### Table 1
Continued


In his pathbreaking paper on life-cycle saving [6], Larry used the life-cycle growth model developed by Tobin (1967) to illustrate the importance of this human wealth effect. For plausible parameter values, he found that it was possible to obtain interest elasticities of saving even larger than Boskin’s (1978) econometric estimates. His results implied that changes in after-tax returns could have large effects on the flow of saving and investment. Subsequent empirical work, such as that by Robert Hall (1988), suggests that such large responses are not borne out by historical experience, but Larry’s work remains an important challenge to these findings.

Although the two projects described above were completed while Larry was in graduate school, neither was included in his doctoral dissertation. His
dissertation, which focused on other issues in capital income taxation, was submitted to Harvard three years after Larry left graduate school, in the same year that he accepted a tenured Harvard professorship. It included four studies that have significantly influenced subsequent research in public finance.

The first part of Larry's dissertation, published as [4], used the q-theory framework developed by James Tobin (1969) to explore the incentive and incidence effects of taxes on corporate capital income. This landmark study contained several important contributions. First, it developed a rigorous foundation for a linear investment equation based on Tobin's q theory, which argues that corporate investment decisions can be explained by the ratio of the stock market's current value and the replacement cost of corporate assets. Larry's analytical framework has become the basis for many subsequent studies using both aggregate time-series data as well as firm-level panel data.

Second, this study introduced tax policy variables to the q-investment framework and provided important new estimates of how tax policy affects investment. Although investment research in the neoclassical accelerator framework, beginning with Hall and Dale Jorgenson (1967), had recognized the importance of modelling tax incentives, previous empirical studies in the q-theory tradition had ignored taxes. Larry not only introduced taxes to the theory, but also showed that incorporating taxes substantially improved the fit of aggregate investment equations. His estimates of how tax policies affect investment, based on aggregate time series data in [4] and firm level data in a parallel study with Michael Salinger [10], are still widely used in assessing various government policies to stimulate investment.
Finally, this study developed what has become known as the “asset price approach” to incidence analysis. As Larry explains in [12], previous analyses of the incidence of differential tax burdens on different types of capital had employed Arnold Harberger’s (1962) framework, in which capital is freely mobile between heavily taxed and lightly taxed sectors. Equilibrium therefore requires that investors are indifferent between investing in different sectors. This implies that altering the tax burden on one type of capital changes the equilibrium return to all capital, whether in the heavily taxed or the lightly taxed sector.

Larry argued that the assumption of complete capital mobility suppressed the short-run revaluation effects that occur when tax reforms alter the tax burdens on capital assets already in place in different sectors. More importantly, he showed that these revaluation effects were large and were likely to represent a critical part of the actual incidence of most tax reforms. Focusing on the asset-price effects of tax changes also yielded new prescriptions for tax policy design, such as avoiding the creation of windfalls for existing asset holders. Larry illustrated this point by comparing two policies that reduce the cost of capital to firms: a reduction in the corporate tax rate and an increase in the rate of investment tax credit. Reducing the corporate income tax rate would raise the after-tax return on existing corporate capital assets, thereby generating a windfall for the holders of such “old capital,” while an investment tax credit would subsidize new investment, without any associated windfall to holders of existing assets.3

A second study in Larry’s dissertation addressed a fundamental question in macroeconomics and finance, which is also critical for evaluating how changes in inflation affect after-tax returns. This is the extent to which nominal interest rates respond to changes in inflationary expectations. Larry’s influential study [11] of U.S. historical experience found, contrary to Irving Fisher’s (1930) prediction and nearly 50 years of prevailing wisdom, that nominal interest rates did not rise point-for-point with expected inflation: they rose much less. Higher inflation rates therefore reduced the real after-tax return to saving by more than standard analyses of the inflation-and-taxes interaction, such as Feldstein (1976), suggested.4 More generally, these findings raised questions about the

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3To evaluate the asset price effects of tax changes in perfect-foresight growth models, Larry needed to find numerical solutions to asset price trajectories in plausibly calibrated saddlepoint-stable rational expectations models. These models had previously been studied exclusively with analytical phase-diagram methods. Larry’s paper on investment [4] and David Lipton and Jeffrey Sachs’ (1983) analysis of exchange rate determination were the first studies to demonstrate that such models could be used as the foundation for quantitative analysis of policy shocks. Numerous subsequent studies have followed in this tradition.

4Summers and Robert Barsky [27] subsequently developed a model to explain the determination of real interest rates under the gold standard. They applied this model to explaining “Gibson’s Paradox,” the observed correlation between the nominal interest rate and the price level during the gold standard period in the United States.
rationality of financial markets, a subject that Larry returned to in research described below.

A third component of Larry's dissertation research focused on how taxes on dividends and capital gains affect investment incentives. Modelling the effects of such taxes is complicated by the lack of agreement on what explains some critical aspects of corporate financial policy. For example, Fischer Black (1976) labelled the high and stable pattern of corporate dividend payouts the "dividend puzzle," because many shareholders face higher tax burdens on dividend income than on capital gains. These investors would earn higher after-tax returns if firms retained and reinvested earnings, or repurchased their shares, rather than paying dividends.

Because firm financial policies are important determinants of the total tax burden on corporate capital income, the economic effects of dividend taxes have attracted substantial attention from public finance economists. Alan Auerbach (1979), David Bradford (1981), and Mervyn King (1977) independently developed an analysis of the incidence of dividend taxes under the assumption that firms face binding constraints on their ability to repurchase shares. This has become known as the "trapped equity" model, and it implies that increases in dividend taxes have no effect on the cost of capital. Because firms are constrained to pay dividends, such taxes are a lump sum tax on existing share holders.

Larry and I [9] analyzed the incidence of dividend taxes in an alternative to the trapped equity model, in which firms pay dividends in spite of their tax disadvantage, because they generate something of value to investors. Such value might arise from information transmission, if dividends provide information on the firm's cash flow position, or it might derive from a reduced need to sell shares to finance potential consumption needs. Our empirical analysis of firm behavior in the United Kingdom, where the tax burden on dividends and capital gains changed several times during the 1950–1980 period, suggested that this "traditional" model substantially outperformed the trapped equity model. These results suggested that higher dividend taxes in fact raised the cost of capital and discouraged investment.

Finally, Larry's dissertation included another section that analyzed whether the interaction between rising inflation rates and the unindexed tax code was responsible for the decline in the real value of the stock market during the 1970s [7]. This chapter, which was never submitted to a journal, found that inflation-induced increases in corporate tax burdens could explain as much as one-third of the stock market's real decline during the 1970s. These results provided important empirical support for the asset price approach to incidence analysis.

Larry's interest in research questions associated with capital income taxation has continued throughout his career. With Jeremy Bulow [13], he examined the long-standing question of how capital income taxation affects incentives for risk taking. Bulow and Summers showed that, because tax
depreciation allowances are specified as a function of an asset’s purchase price even though most assets’ resale values fluctuate widely over their lifetimes, existing depreciation policies discourage investment in risky assets.

In joint work with Lawrence Goulder [32], Larry also developed a multi-sector general equilibrium model that incorporates both asset price dynamics and rich detail on the production and consumption structure of the economy. This model represents the state of the art in analyzing the asset revaluations associated with tax reform. Larry’s more recent research on the social externalities of equipment investment also bears on the design of capital income taxes. Larry argued in [23] that if some assets generate greater externalities than others, then the stated objective of the Tax Reform Act of 1986, “levelling the playing field” by placing equal effective tax rates on all assets, may be inappropriate. His recent empirical work, described in more detail below, suggests the potential importance of this argument.

**Labor Economics and Unemployment**

A second major component of Larry’s research portfolio focuses on labor economics, particularly macroeconomic aspects of labor market activity. During the mid-1970s, several influential studies, such as Feldstein (1975) and Hall (1972), developed a “turnover” view of the U.S. labor market. These studies showed that there was a high probability that an individual would move between employment and unemployment in a given year, and also documented high month-to-month exit rates from unemployment. This research was interpreted as suggesting that the welfare cost of unemployment was relatively low, since most unemployment spells were of short duration.

In 1978, supported by a $4,500 research grant from the Assistant Secretary for Policy Evaluation and Research at the U.S. Department of Labor, Larry collaborated with fellow graduate student Kim Clark on a project examining the dynamics of labor market activity. In a blockbuster paper that remains a standard reference, Clark and Summers [2] challenged, and largely debunked, the turnover view.

First, Clark and Summers drew attention to the labor market analogue of an important result in renewal theory. Even if most of the individuals who experience unemployment over the course of a year experience short unemployment spells, it is still possible that most unemployed individuals at any point in time are in the midst of long spells. This occurs because the pool of unemployed individuals at each moment includes a higher proportion of those suffering long spells of unemployment than those suffering only short spells.

Second, Clark and Summers used newly released data from matched Current Population Survey tapes, as well as unpublished data on labor market gross flows, to show that many of the individuals who exited unemployment in one month became unemployed again in the following month. This reflected a
combination of poor definition of the boundary between unemployment and not-in-the-labor force, a high rate of measurement error, and the relatively short expected duration of many jobs that unemployed workers find. This finding undermined a key component of the turnover view of unemployment, because it suggested that the probability of becoming unemployed was related to previous unemployment experience, and not “memoryless.” It suggested that the actual concentration of unemployment spells was greater than that predicted by probabilistic models in which previous unemployment experience is unrelated to current experience.

A related line of inquiry reinforced the attack on the turnover view of unemployment. In a joint paper [17], Larry and I used data from the Current Population Survey Reinterview Survey to estimate the incidence of response errors in the gross flows data. Our findings showed that errors were prevalent, especially in misclassification of unemployed individuals as out-of-the-labor force. We developed an algorithm that used the Reinterview Survey to “adjust” the monthly flows data, and found that the degree of labor market dynamism was far lower than early advocates of the turnover view believed.

Larry has also conducted research on the role of the labor market in aggregate economic fluctuations. Clark and Summers [8] tested Robert Lucas and Leonard Rapping’s (1969) hypothesis that labor market fluctuations could be explained by intertemporal substitution of labor supply. They studied whether the increase in women’s labor force participation during World War II had persistent effects on women’s labor supply. Movement into the labor force was followed by continued labor force participation, not by labor market withdrawal as the intertemporal substitution hypothesis would suggest. This paper is a prime example of one aspect of Larry’s empirical research style, his search for exogenous shocks that can reveal important information about economic questions.

N. Gregory Mankiw, Julio Rotemberg, and Summers [15] presented further evidence contradicting the intertemporal substitution hypothesis. They observed that consumption is procyclical, while leisure is countercyclical. This makes it difficult to explain aggregate labor market fluctuations on the basis of representative consumer models in which consumption and leisure are complements. This finding is one of the stimuli to the substantial and growing literature that emphasizes non-separabilities in utility functions, habit persistence, and richer models of labor market institutions as ways to explain the observed covariation of hours and consumption.

An additional line of research on labor markets, also motivated by questions of macroeconomic adjustment, focuses on “efficiency wages.” Larry’s first paper on this subject was a theoretical analysis with Bulow [16]. This paper applied the framework developed by Carl Shapiro and Joseph Stiglitz (1984) to study a wide range of applied issues in labor economics. It showed that when imperfect monitoring of worker effort leads firms to pay wages in excess of a worker’s opportunity cost, and to fire those workers who are caught shirking,
many standard properties of well-functioning neoclassical labor markets must be qualified. Involuntary unemployment is possible, raising the minimum wage may increase social welfare, and there may be a justification for government intervention to protect particular industries.

In later work with Lawrence Katz [34], Larry applied a similar framework to study the labor market effects of international competition. Katz and Summers argued that being rationed into employment in a low-wage sector is similar to being rationed into unemployment, and therefore suggested that trade policies that affect the sectoral composition of domestic employment can have important welfare effects.

Because so many issues of labor market analysis turn on whether firms pay efficiency wages, Larry also carried out empirical studies directed at this issue. His work with Alan Krueger [25] studied the nature of interindustry wage differentials and showed that there are important “industry effects” in wage equations estimated using individual-level data, even after controlling for individual and job characteristics. In effect, this study shows that there are high-wage and low-wage industries and that these differences affect workers in most occupations within these industries. It has attracted numerous extensions and remains one of the key sources of empirical support for efficiency wage models.

A related study with Daniel Raff [26] drew on historical analysis of the Ford Motor Company’s experience when Henry Ford decided to raise his factory’s daily wage to $5, well above prevailing local wages. Raff and Summers marshaled evidence consistent with efficiency wage models and suggested that the productivity of Ford workers increased when wages were raised.

Larry’s skill in analyzing both labor markets and public policy is also displayed in a brief study, [33], comparing the incentive effects of government mandates that employers provide certain private goods with the alternative of tax-financed government provision of these goods. This paper, which anticipated the current health care reform debate by several years, showed that mandated benefits could be more efficient than tax-financed government spending. This finding has attracted substantial attention and stimulated further work as the prospect for new government mandates has grown.

Financial Economics

Financial economics, and the interplay between macroeconomics and finance, has been one of Larry’s enduring research interests. Much of his research on capital income taxation was stimulated by the search for rational explanations of the substantial decline in real U.S. equity values during the 1970s. In the early 1980s, Larry’s interest turned to a number of issues that are primarily within the purview of financial economics.

Larry’s first important contribution to financial economics, [18], explored the evidentiary basis for the common view that stock markets are efficient. This
paper, written in 1981, was summarily rejected by the *Journal of Finance*. Five years later, when Black was president of the American Finance Association, he invited Larry to present it at the AFA meetings, and included it in the proceedings issue of the *Journal of Finance*. In conjunction with research by Robert Shiller (1981) and others on asset price fluctuations, this work has had a substantial subsequent impact on financial economics.

Larry’s paper on market efficiency showed that although numerous empirical studies had failed to reject the random walk theory of stock prices, most of their empirical tests had very low power against an important set of alternative models of asset price determination with very different implications for market efficiency. Larry examined the case in which asset prices are the sum of two components, one a random walk and the other a slowly decaying, mean-reverting random variable. He showed that if the mean-reverting component decayed slowly enough, standard tests of whether asset prices follow a random walk would fail to reject the null hypothesis unless the underlying data set spanned a far longer time period than any existing data set on asset returns. This paper challenged one of the central empirical canons of financial economics.

Larry’s subsequent research extended his analysis of market efficiency in two directions: searching for empirical evidence of deviations from random walk behavior in asset prices, and developing models of asset price formation in which investor sentiment and other factors lead prices to deviate from their fundamental values.

Larry’s work on the empirical properties of asset returns began with our joint paper, [28], which demonstrated that stock prices in the United States exhibit a significant degree of mean reversion. While this was not apparent in studies that had focused on predicting daily or monthly stock returns from their own recent lagged values, it was clear in our analysis of longer-horizon stock returns. We showed, for example, that the variability of stock returns over horizons of eight years was only about half as great as it would be if each year’s return was statistically independent of all other returns.

The empirical findings in this study and others that have been published since the mid-1980s have largely overturned the previous conventional wisdom in financial economics. There is now a broad consensus that asset returns are, in part, predictable, and research attention has shifted to the question of why this is so. Since equilibrium returns may fluctuate over time, predictability *per se* is not inconsistent with market efficiency. Current research, surveyed in Eugene Fama (1991), is directed at this question.

Larry’s second line of research on market efficiency has focused on the impact of “noise traders” in financial markets. The premise of this research program is that some participants in financial markets decide which assets to purchase on the basis of information other than the rational expected present discounted value of future cash flows. These investors may be affected by swings of sentiment, by misguided extrapolation of past returns to the future, or by a range of other factors. Even the most devoted efficient market
proponent will acknowledge that such investors exist; everyone has a relative who has a “hot tip.”

The central economic question is whether noise traders affect asset prices. Most financial economists follow Milton Friedman (1953) in dismissing such traders. Friedman argued that uninformed investors cannot outperform more rational investors, so their wealth and market influence must decline over time and asymptotically vanish. J. Bradford DeLong, Andrei Shleifer, Summers, and Robert Waldmann [35] challenged this view. They showed that the presence of noise traders in a market can increase the volatility of asset prices, thereby discouraging rational traders from participating in the market and arbitraging prices to their rational values.

Summers and his coauthors developed an ingenious framework both for introducing noise traders to financial markets and for analyzing the comparative static properties of changes in the trading environment. They explored the role of investor sentiment and limited arbitrage opportunities in a series of related papers, summarized in Shleifer and Summers [36]. In particular, they called attention to the possibility that some investors follow positive feedback investment strategies, such as basing their predictions of future returns on past returns, that may generate substantial “noise trader risk” in financial markets.

One empirical project that provided some empirical support for the “noise trader” view was David Cutler, Larry, and my project [31] on the source of stock price movements. Stimulated by the puzzling events of October 1987, this study analyzed the individual days on which the U.S. stock market recorded its largest gains and losses, and then searched for associated news events that could justify such price moves. In most cases, it proved difficult to identify any such news. Running the same experiment in reverse showed that days with substantial news, such as elections, assassinations, or similar events, were not outliers when measured by the absolute value of stock market returns.

Along with these projects on asset pricing, Larry has also done important work in corporate finance. Two studies deserve particular note. One, with Cutler [29], exploited the “natural experiment” provided by the Texaco–Pennzoil litigation of the mid-1980s to estimate the costs of financial distress. The Texaco–Pennzoil battle was a lawsuit over damages from a failed takeover attempt. Pennzoil received a $10 billion jury award in a Texas court, and, in a protracted legal battle, Texaco took various measures to avoid paying this settlement. At one stage, Texaco filed for bankruptcy protection.

Cutler and Summers’ key insight was that this dispute was a zero sum game between Pennzoil and Texaco, except for the potential legal and business costs of operating a large firm on the verge of bankruptcy. By comparing the gain in Pennzoil’s market value with the loss in Texaco’s value, they estimated that bankruptcy costs could be as much as 30 percent of the value of the jury award.

A second project in corporate finance focused on the social gains associated with hostile takeovers. The takeover wave of the 1980s sparked numerous
questions about the net benefits of such corporate control transactions. Workers at target firms were sometimes displaced, but takeover proponents such as Michael Jensen (1988) argued that the increase in the market value of target firms represented an improvement in efficiency that ultimately worked to society’s benefit. In a paper coauthored with Shleifer [30], Larry observed that some of the target shareholders’ gain could come at the expense of other corporate “stakeholders” whose implicit contracts were abrogated, and illustrated this possibility with several case studies. This paper incited an acrimonious debate on the merits of hostile takeovers. Its durable contribution is the important insight that stockholder gains are not the same as social welfare gains.

**Macroeconomics and Economic Fluctuations**

Virtually all of Larry’s research in public finance, labor economics, and financial economics has been concerned with macroeconomic issues. Larry has also carried out a number of projects with a more exclusive macroeconomic focus. This section describes four strands of this research.

Persistent high unemployment rates in the major European economies during the 1980s constitute an important challenge to standard theories of macroeconomic adjustment. This led Olivier Blanchard and Summers to undertake a substantial research program designed to explain the apparent failure of standard equilibration mechanisms in European macroeconomies. In [19], they proposed the “hysteresis” explanation of persistent unemployment. They argued that as a result of a number of stylized features of actual labor markets, such as insider control of unions and human capital decay during periods of unemployment, aggregate demand shocks could have long-lived effects. This research suggested that the natural rate of unemployment at any moment depended on the past history of unemployment.

Blanchard and Summers showed that the “hysteresis” view altered traditional analyses of fiscal policy, and argued that tax cuts might be self-financing for some European nations. In later work [24], they developed the notion of “fiscal increasing returns.” They showed that increasing returns from the production function itself, or arising from potential reductions in tax rates when output expands, can obviate the need for a real wage decline in order to restore equilibrium in high-unemployment economies. These arguments provide an important justification for traditional Keynesian policies, without relying on the standard assumptions of nominal wage or price rigidity.

A second major issue in macroeconomics that Larry has addressed is the nature, and significance, of nominal wage and price rigidities. Larry, Julio Rotemberg, and I [20] studied the evolution of wages, prices, and aggregate output in the U.K. after a change in government in the early 1970s resulted in a major shift from direct to indirect taxation. If nominal wages and prices are
fully flexible, then a revenue-neutral shift from wage to sales taxation should have no real effects. In fact, we found that such a policy reduced output, consistent with the presence of nominal rigidities. This finding supports neo-Keynesian analyses of economic fluctuations.

In two subsequent papers, Larry examined the economic consequences of price rigidities. DeLong and Summers [21] showed that even though price rigidities can be an important source of economic fluctuations, reducing the degree of price rigidity in an economy with some rigidity can actually destabilize output. Their argument focuses on the potential for adverse aggregate demand effects when increased price flexibility results in inflation, which in turn reduces the real wealth of some households. A subsequent paper with Rotemberg [37] showed that nominal price rigidities, resulting for example from the need to set prices before demand is known, can generate a procyclical pattern in productivity. The extent of procyclical productivity depends on the level of labor hoarding and price rigidity in an industry, and the paper showed that cyclical productivity patterns are more pronounced in those industries with lower labor turnover.

A third strand of macroeconomic research, related to some of Larry's work on capital income taxation, focuses on the determinants of household saving behavior. While Larry was applying the multiperiod life-cycle model to analyzing the interest elasticity of saving, he and Laurence Kotlikoff [5] embarked on a project designed to evaluate the empirical relevance of this model. They developed an elaborate algorithm for estimating the share of U.S. wealth that could be attributed to life-cycle saving. They used age-earnings and age-consumption profiles to build age-wealth profiles for individual households, and also grossed up intergenerational transfers to obtain an upper bound for the importance of life-cycle saving.

Their empirical findings suggested that life-cycle saving accounted for less than half, and possibly much less than half, of accumulated household net worth in the United States. These estimates, challenged by Franco Modigliani (1988) and defended by Kotlikoff (1988), remain controversial. However, this line of research has stimulated a substantial volume of subsequent research on household saving behavior and particularly on the role of bequests in capital accumulation.

Larry further explored the empirical validity of the life-cycle model in a recent study with Christopher Carroll [39]. This study used household-level surveys of income and expenditure to show that for most households, labor income closely tracks consumption over the life cycle. This finding has been one of several empirical regularities that have stimulated interest in alternatives to the life-cycle model, such as models of precautionary saving or bequest-motivated saving, as potential explanations for household saving decisions.

Larry's research on saving also includes one of his most colorful studies, a joint paper with B. Douglas Bernheim and Shleifer [14] that developed and tested a model in which individuals derive utility from bequests. As with many
of Larry's research projects, this one began with a puzzle: why don't individuals annuitize their wealth when they reach retirement, as the life-cycle model suggests they should? The coauthors developed a model in which control over wealth provides important utility benefits: individuals who control bequeathable wealth and who can disinherit heirs or charities receive more attention, or other benefits, than those without such wealth.

The model alone is an important contribution to the literature on saving behavior. But Bernheim, Shleifer, and Summers also tested one of its key implications using data from the Retirement History Survey. They analyzed survey questions on how frequently elderly individuals receive visits and telephone calls from their children, and uncovered a strong correlation between both measures of attention and an elderly household's bequeathable wealth. They found no comparable correlation between attention and non-bequeathable wealth. Both findings provide support for their model.

A final component of Larry's macroeconomic research that is concerned primarily with the source of economic growth is his research program on equipment investment and economic growth. DeLong and Summers [38] analyzed growth rates from a large cross section of nations and found that countries that devote a high share of GDP to equipment investment tend to grow faster, all else equal, than nations with a lower equipment-to-GDP share. Equipment investment appears to generate more economic growth than equal-value structures investment. This result, which is consistent with the view that equipment investment carries greater social externalities than investment in structures, has important implications both for tax policy design and for economic development strategy.

**Mentor, Teacher, Friend**

This paper describes many, but not all, of Larry's research contributions in public finance, labor economics, financial economics, and macroeconomics. It has not touched on his work in several other fields, including international economics [34], economic demography [22], economic history [3], and development economics [40]. Larry's influence on economic science, however, goes beyond his contributions in particular subfields. He has promoted a particular style of economic research, and leading by example, he has drawn a cohort of young researchers into adopting, and extending, his approach to empirical economics. As the Clark Medal citation put it, Larry's research "has inspired a

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5Larry's parents, Robert and Anita Summers, are both distinguished economists. This sometimes causes confusion in research attribution. For example, DeLong and Summers [38] analyze the widely used Summers–Heston data set, which was developed and described in detail by Robert Summers and Alan Heston (1991). Moreover, while Larry has contributed much to public finance, he should not be credited for Anita Summers and Barbara Wolfe's (1977) widely cited study on production functions in public education.
new generation of economists, many of them his students and collaborators, who are now reconstructing the empirical foundations of the discipline.”

What are the key elements of Larry’s research style? First, his research is directed at first-order economic issues, such as saving, unemployment, investment, and market efficiency. In one discussion of research strategy, Larry remarked that “it’s about as much work to write a paper on a big question as on a little one, so you might as well pick a big one.” Another favorite bit of advice is to “be about the economy, not about the economics literature.” Larry’s own research has followed these prescriptions.

Second, Larry’s research is always directed at answering a question. Does saving respond to after-tax interest rates? Is unemployment a transitory phenomenon for most individuals? Are stock returns predictable? On many occasions I have heard Larry advise doctoral students to avoid projects that are best described as “a study of...” and to select instead projects that ask well-posed, and answerable, questions. One of Larry’s lasting contributions in many of the fields described earlier is his concise identification of the key questions. Is life-cycle saving empirically important? Do tests of market efficiency have any statistical power? Were rising corporate tax burdens responsible for declining real share prices in the 1970s? Even when his particular answers have been challenged by other researchers, the questions that Larry identified, and the frameworks he developed for answering them, have remained.

Third, Larry tries to marshall all of the available empirical evidence to address particular questions. He is never satisfied with studying only the data in the National Income and Product Accounts, or in widely used survey data sets. Larry was in the vanguard of the recent movement in empirical economics that has sought to identify exogenous shocks to various aspects of economic activity, and to study the effects of these shocks as a way of learning about key economic parameters. Many of Larry’s research projects, such as the labor market effects of World War II or the financial effects of the Texaco–Pennzoil bankruptcy, illustrate this research strategy. This approach has been refined by many subsequent researchers, and is closely related to the focus on “natural experiments” that has become popular in labor economics, public finance, and other applied fields in recent years.

Fourth, Larry’s research style involves many simultaneous projects in various stages of completion, and is often associated with vast amounts of data analysis. This approach lends itself to involving a veritable army of research assistants and collaborators. It also helps to identify robust empirical findings and to suggest potential empirical puzzles, such as disparities between findings in aggregate and household-level data, that demand further research.

Finally, Larry’s conceptual approach to economics has evolved from a focus on perfectly competitive models with fully informed, rational agents, to a greater consideration of models and theories that embody market imperfections and incomplete rationality. His early research on life-cycle saving and corporate investment relied heavily on rationality assumptions, while his later
work on labor market hysteresis, failures of the life-cycle model, and "noise traders," has moved away from these assumptions. This shift in part reflects Larry's dissatisfaction with the empirical content of the assumption of agent rationality in many contexts.

This paper has focused on Larry's research, but no description of his contributions to economics would be complete without some discussion of his role as an advisor, collaborator, and mentor. Although the "holding patterns" outside his office doors at both MIT and Harvard were legendary among graduate students, the predictable wait did not deter scores of students and colleagues from seeking his advice. Larry's success as a mentor to undergraduates, graduate students, and young researchers is extraordinary. The most powerful evidence of his contribution to economic science is the popularity of his research style amongst the younger cohort of empirical economists, many of whom are proud to count themselves as Larry's students.

I am grateful to Jeremy Bulow, Alan Krueger, Nancy Rose, Julio Rotemberg, Andrei Shleifer, and Timothy Taylor for encouragement, suggestions, and helpful comments on an earlier draft, and to the Center for Advanced Study in the Behavioral Sciences and the National Science Foundation for research support.

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6One former student recalls Larry walking out of his office, apologizing that their meeting would be delayed by at least an hour, and then suggesting that "you could read some of my working papers while you're waiting."
References


