Emmanuel Saez: 2009 John Bates Clark Medalist

B. Douglas Bernheim

Emmanuel Saez, winner of the 2009 John Bates Clark Medal, has distinguished himself by making fundamental contributions concerning critical theoretical and empirical issues within the field of public economics. He is one of those exceptional scholars whose work reflects a broad and thoroughly integrated vision. In carefully and creatively implementing that vision, he has led a remarkable resurgence of interest in tax policy research over the last decade.

Emmanuel was born in Spain. He received a B.A. degree in mathematics from Ecole Normal Superieure in 1994 and an M.D. degree in economics from DELTA in 1996 before starting his graduate work at MIT. After completing his Ph.D. in 1999, he spent three years as an assistant professor at Harvard University before moving to the University of California at Berkeley. There he has remained, despite many attempts by his fans at other universities to pry him away.

One cannot discuss economics with Emmanuel without being impressed by his seriousness of purpose. And yet, there are intriguing signs that he has struck a deliberate balance in his life on the labor–leisure margin. As chair of the Honors and Awards Committee of the American Economic Association, it was my happy privilege to notify Emmanuel once the Executive Committee selected him as the winner of the Clark medal. Generally the name of the winner is withheld from the press until the winner has been contacted, so it was essential for me to locate him quickly. But he was nowhere to be found. Some candidates may wait by the phone in anxious anticipation of victory, but not Emmanuel. Fearing we might have to delay the press release over a weekend, I turned to his friend and colleague,

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David Card, who advised me that Emmanuel often pursues another avocation on Fridays. David's wife contacted Emmanuel's wife, who in turn tracked him down at the beach where he was surfing—this in April, when the ocean waters off of the northern Californian coastline are frigid, to say the least. I have a mental image of Emmanuel clad in his wetsuit, riding his board through the curl with a great white shark in hot pursuit, clutching his mobile phone against his ear while learning of the award—certainly a first for the Clark Medal![1]

Emmanuel's work can be divided into five areas: the theory of optimal taxes and transfers; the measurement of income and wealth distributions; the measurement of behavioral responses to personal taxation; the taxation of corporate dividends; and retirement saving. A great deal of his work is closely interrelated across these topics, which makes the whole considerably greater than the sum of the parts. In effect, he has bridged the chasm between theory and practical policymaking by attacking the policy design problem from both sides at once. On the theory side, he has been perhaps the most visible leader in advancing the "sufficient statistic" agenda, which attempts to map empirically measurable elasticities, simple characteristics of the economic environment (like income distribution parameters), and easily interpreted indexes of distributional preferences into policy prescriptions. On the empirical side, he has undertaken careful and creative studies designed to fill the gaps in measurement identified by the theory. In this way, Emmanuel has converted a large body of relatively dry theory into a far more powerful practical tool.

The rest of this article provides a survey of Emmanuel's work. Within each of the five main topic areas, I attempt to provide a bit of intellectual context, summarize a few of Emmanuel's most significant contributions, and then briefly review his other work. In the process, I discuss the 33 papers listed in Table 1 in varying degrees of detail. The list is not comprehensive; Emmanuel's Berkeley website lists links to 47 papers. Given the uniformly high quality of the papers I know, I am sure I must have missed a few gems.

The Theory of Optimal Taxes and Transfers

The theory of optimal income taxation was largely dormant for many years. Though scholars specializing in public economics dutifully continued to teach the seminal contributions of Mirrlees (1971) and others, by the end of the 1990s most had come to regard that line of research as "played out" and somewhat sterile, with relatively few implications that policymakers ought to take seriously. Emmanuel has been the most important figure in rejuvenating this line of research. His work has persuaded many economists to reconsider its applicability to practical policy-making. He has accomplished this feat by showing that, starting from reasonably realistic optimal income tax problems, one can derive relatively simple relation-ships between policy prescriptions and measurable economic parameters. In other

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[1] When asked how he felt about winning the Clark Medal, Emmanuel responded, "Dude, it's epic!" At least that is how I remember our conversation.

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work, he set about measuring those parameters. Thus, unlike most others who have worked in this area, Emmanuel straddles the great divide between theory and empirics, and he brings the two noticeably closer together. Three papers exemplify his theoretical contributions.

Emmanuel's first major contribution to the theory of optimal personal income taxation (item [1] in Table 1) was originally part of his Ph.D. dissertation, and was inspired in large part by the work of his advisor, Peter Diamond.[2] Those of us who remember him as a rising star on the junior faculty job market in 1999 recall it as his "job market" paper. In it, Emmanuel uses an intuitively straightforward method to derive an easily interpreted solution for the Mirrlees optimal income tax problem.

In the way Mirrlees framed the optimal tax problem, the government seeks to raise a fixed amount of revenue from a large collection of individuals, who allocate their available time H between leisure ℓ and labor $(H-\ell)$, taking their skills s and the government's tax schedule, the function T, into account.[3] Individuals are differentiated according to skills, which translate into different marginal products. A worker's pre-tax labor income, z, equals the product of that worker's skill level and labor supply, $s(H-\ell)$. The government cannot observe any individual's skill level, but it knows the distribution of skills and can measure labor income, z. Thus, the tax schedule T can depend on labor income z, but nothing else. After paying taxes, an individual with pre-tax income z consumes $z-T(z)$. The government chooses

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[2] As I explain below in footnote 8, Diamond (1998) provided an elegant solution for a simplified version of the optimal income tax problem.

[3] Throughout, it is important to bear in mind that $T(z)$ reflects all taxes on earnings, and not simply the federal personal income tax.

Table 1
Selected Papers by Emmanuel Saez

1. "Using Elasticities to Derive Optimal Income Tax Rates." 2001. *Review of Economic Studies,* 68(1): 205–229.
2. "Optimal Income Transfer Programs: Intensive versus Extensive Labor Supply Responses." 2002. *Quarterly Journal of Economics,* 117(3): 1039–1073.
3. "The Optimal Income Taxation of Couples," (with Henrik Kleven and Claus Kreiner). 2009. *Econometrica,* 77(2): 537–560.
4. "The Desirability of Commodity Taxation under Non-linear Income Taxation and Heterogeneous Tastes." 2002. *Journal of Public Economics,* 83(2): 217–230.
5. "Direct or Indirect Tax Instruments for Redistribution: Short-Run versus Long-Run." 2004. *Journal of Public Economics,* 88(3–4): 503–518.
6. "Optimal Progressive Capital Income Taxes in the Infinite Horizon Model." 2002. NBER Working Paper 9046.
7. "The Optimal Treatment of Tax Expenditures." 2004. *Journal of Public Economics,* 88(12): 2657–84.
8. "Optimal Taxation and Social Insurance with Endogenous Private Insurance," (with Raj Chetty). Forthcoming. *American Economic Journal: Economic Policy.*
9. "Optimal Minimum Wage in Competitive Labor Markets," (with David Lee). 2008, 2010. NBER Working Paper 14320, September 2008, revised January 2010.
10. "Income Inequality in the United States, 1913–98," (with Thomas Piketty). 2003. *Quarterly Journal of Economics,* 118(1): 1–39.
11. "Income Inequality in the United States, 1913–2002," (with Thomas Piketty). 2007. Chapter 5 in *Top Incomes over the Twentieth Century: A Contrast Between European and English Speaking Countries,* ed. A. B. Atkinson and T. Piketty. Oxford: Oxford University Press, 141–225.
12. "Top Wealth Shares in the United States, 1916–2000: Evidence from Estate Tax Returns," (with Wojciech Kopczuk). 2004. *National Tax Journal,* vol. 57, no. 2, part 2, pp. 445–87.
13. "Earnings Inequality and Mobility in the United States: Evidence from Social Security Data since 1937," (with Wojciech Kopczuk and Jae Song). 2010. *Quarterly Journal of Economics,* 125(1): 91–128.
14. "The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence," (with Michael Veall). 2005. *American Economic Review,* 95(3): 831–849.
15. "The Evolution of High Incomes in Canada, 1920–2000," (with Michael Veall). 2007. Chapter 6 in *Top Incomes over the Twentieth Century: A Contrast Between European and English Speaking Countries,* ed. A. B. Atkinson and T. Piketty. Oxford: Oxford University Press, 226–308.
16. "The Evolution of Income and Wealth Concentration in Switzerland over the 20th Century," (with Fabien Dell and Thomas Piketty). 2007. Chap. 11 in *Top Incomes over the Twentieth Century: A Contrast Between European and English Speaking Countries,* ed. A. B. Atkinson and T. Piketty. Oxford: Oxford University Press, 472–500.
17. "The Evolution of Income Concentration in Japan, 1885–2005: Evidence from Income Tax Statistics," (with Chiaki Moriguchi). 2008. *Review of Economics and Statistics,* 90(4): 713–34.
18. "Income and Wealth Concentration in Spain in a Historical and Fiscal Perspective," (with Facundo Alvaredo). 2009. *Journal of the European Economic Association,* 7(5): 1140–67.
19. "Top Incomes in the Long Run of History," (with Anthony Atkinson and Thomas Piketty). Forthcoming. *Journal of Economic Literature.*
20. "The Evolution of Top Incomes: A Historical and International Perspective," (with Thomas Piketty). 2006. *American Economic Review: Papers and Proceedings,* 96(2): 200–205.
21. "The Effect of Marginal Tax Rates on Income: A Panel Study of Bracket Creep." 2003. *Journal of Public Economics,* 87(5–6): 1231–58.
22. "Do Taxpayers Bunch at Kink Points?" Forthcoming. *American Economic Journal: Economic Policy.*
23. "Do Taxpayers Bunch at Kink Points?" 1999. NBER Working Paper 7366.
24. "The Elasticity of Taxable Income: Evidence and Implications," (with Jonathan Gruber). 2002. *Journal of Public Economics,* 84(1): 1–32.

Table 1 (continued)

25. "Teaching the Tax Code: Earnings Responses to an Experiment with EITC Recipients," (with Raj Chetty). 2009. NBER Working Paper 14836.

26. "Unwilling or Unable to Cheat? Evidence from a Randomized Tax Audit Experiment in Denmark," (with Henrik Kleven, Martin Knudsen, Claus Kreiner, and Soren Pedersen). 2010. NBER Working Paper 15769.

27. "Taxation and International Mobility of Superstars: Evidence from the European Football Market," (with Henrik Kleven and Camille Landais). December 2009. Available at: *http://elsa .berkeley.edu/~saez/.*

28. "Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut," (with Raj Chetty). *Quarterly Journal of Economics,* 120(3): 791–833.

29. "Dividend and Corporate Taxation in an Agency Model of the Firm," (with Raj Chetty). Forthcoming. *American Economic Journal: Economic Policy.*

30. "The Role of Information and Social Interactions in Retirement Plans Decisions: Evidence from a Randomized Experiment," (with Esther Duflo). 2003. *Quarterly Journal of Economics,* 118(3): 815–42.

31. "Participation and Investment Decisions in a Retirement Plan: The Influence of Colleagues' Choices," (with Esther Duflo). 2002. *Journal of Public Economics,* 85(1): 121–48.

32. "Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block," (with Esther Duflo, William Gale, Jeffrey Liebman, and Peter Orszag). 2006. *Quarterly Journal of Economics,* 121(4): 1311–46.

33. "Details Matter: The Impact of Presentation and Information in the Take-up of Financial Incentives for Retirement Savings." 2009. *American Economic Journal: Economic Policy,* 1(1): 204–28.

the tax schedule T to maximize a utilitarian social welfare function subject to a balanced budget requirement. The objective function implies some desire for equality, because there is diminishing marginal utility from additional income, but greater equality comes at the cost of efficiency, because any equalizing tax schedule distorts the labor–leisure choice. When the government is free to consider any conceivable tax schedule, this problem is technically challenging. Mirrlees solved it by converting it into a dynamic programming problem. That approach yields few general results and delivers a solution that is, for the most part, relatively unintuitive and difficult to interpret.

Perhaps the most novel contribution of [1] is that it provides a simple, elegant, easily derived, and reasonably general formula for the optimal marginal tax rate at very high income levels. One of the few unambiguous prescriptions emerging from traditional analyses of the Mirrlees problem is that the marginal tax rate at the very top of a bounded income distribution should be zero (Sadka, 1976; Seade, 1977).[4] That result is widely regarded as a curiosity and of little relevance to public policy, both because it seems contrary to common sense and because it

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[4] Intuitively, starting from any tax schedule that imposes a positive marginal tax rate on individuals at the very top of the income distribution, one can unambiguously improve welfare by allowing those individuals to keep all income received beyond the amount they would choose to earn when facing the original tax schedule: government revenue would not change, and those individuals would be better off. However, that argument hinges on the absence of more highly skilled individuals who might choose to shirk (imitating the behavior of their less-skilled counterparts) if the tax schedule were modified in the aforementioned way.

does not necessarily characterize optimal tax rates *near* the top of the distribution (Tuomala, 1990).

Emmanuel focuses on settings in which the income distribution is unbounded and investigates the limiting value of the optimal marginal tax rate. The logic of this approach is that the optimal tax rates for individuals with very high incomes (say those earning between $500,000 and $5 million) should be close to this limiting rate, even if the actual income distribution is bounded, provided that the bound is sufficiently astronomical (say, $700 million for the top-paid chief executive officer).

Emmanuel's method of determining optimal marginal tax rates for high-income taxpayers is stunningly simple and powerful. Say the optimal tax schedule based on labor income z is $T(z)$. Assuming the marginal tax rate approaches some limiting value, we can approximate $T(z)$ with the function

$$\hat{T}(z) = \begin{cases} T(z) & \text{for } z \leq z_0 \\ T(z_0) + \tau(z - z_0) & \text{for } z > z_0 \end{cases}$$

Suppose then that we maximize the government's utilitarian objective function over the choice of τ, fixing T. Provided we choose z_0 sufficiently large, the optimal value of τ should be close to the marginal tax rates implied by the optimal tax schedule for levels of income in excess of z_0. While the solution to the simplified problem depends upon the rest of the optimal tax schedule T, it turns out that the first-order condition for τ allows us to characterize the optimal high-income tax rate without actually knowing T. Thus, the problem reduces to maximizing an objective function over a single variable.

Through straightforward and intuitive arguments, Emmanuel obtains the following formula for the optimal value of τ:

$$\frac{\tau}{1 - \tau} = \frac{(1 - \bar{g})(\bar{z}/z_0 - 1)}{\zeta^u \bar{z}/z_0 - \bar{\eta}}$$

where g is the ratio of the marginal social value of private income to the marginal social value of public funds (which varies according to the individual's income level), ζ^u is the uncompensated elasticity of earnings (with respect to $1 - \tau$), η measures the sensitivity of earnings to virtual income,[5] and a bar (like on $\bar{g}$) indicates the average value of a variable for individuals with incomes exceeding z_0.[6] The formula is easily calibrated. For sufficiently high-income individuals, it may be reasonable to assume (depending on one's normative outlook) that the marginal social value of consumption is small relative to the marginal social value of public funds, so $\bar{g} \approx 0$. According to the available evidence, income effects are fairly small, so $\bar{\eta} \approx 0$.

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[5] Let $(\ell(s), z(s) - T(z(s)))$ denote the bundle of leisure and goods a worker with skill level s chooses to consume when faced with the tax schedule T. Virtual income is defined as the level of income required to render that same bundle feasible when that worker faces a linear tax schedule with a constant marginal tax rate equal to $T'(z(s))$.

[6] In the case of ζ^u, the average is income-weighted.

In addition, Emmanuel shows that for the United States, starting with incomes of $150,000, the value of $\bar{z}/z_0$ is roughly constant for large values of z_0 (indicating that the upper tail of income follows a Pareto distribution) and equal to 2. Substituting those values into the preceding formula and rearranging, we obtain:

$$\tau = \frac{1}{1 \ + \ 2\bar{\zeta}^u}\ .$$

The preceding formula expresses the optimal marginal tax rate for high-income individuals as a function of the uncompensated elasticity of earnings with respect to the marginal tax rate. On the one hand, if the elasticity is 2, a value roughly in keeping with the findings of Feldstein (1995), then the implied optimal high-income marginal tax rate is only 20 percent. On the other hand, if the elasticity is 0.25 (a value roughly in keeping with Emmanuel's own findings, discussed below), then the optimal high-income marginal tax rate is 66.7 percent. Thus, the uncompensated elasticity of earnings emerges as the key parameter in determining the appropriate marginal tax rate for high-income individuals.

Emmanuel also solves the full Mirrlees problem using an intuitive perturbation method. Specifically, for any given level of income z^*, he considers the effects of a small increase ($\Delta\tau$) in the marginal tax rates on incomes between z^* and $z^* + \Delta z^*$, leaving the rest of the tax schedule unchanged. He observes that the welfare effects of such a change fall into three categories. First, there is a "mechanical" effect: taxpayers with incomes above z^* pay an additional $\Delta\tau\Delta z^*$ in taxes. Thus, if $g(z)$ represents the marginal social value of consumption for an individual with income z (expressed relative to the social marginal value of public funds), the net effect on social welfare for such an individual is $(1 - g(z))\,\Delta\tau\Delta z^*$. Second, there is an "elasticity" effect: the increase in the marginal tax rate for individuals with incomes between z^* and $z^* + \Delta z^*$ leads to a small reduction in their labor supply. Third, there is an "income" effect: each individual with pre-tax income above $z^* + \Delta z^*$ works more to compensate for the decline in his or her post-tax earnings ($\Delta\tau\Delta z^*$). Having accounted for the mechanical effect, neither the elasticity effect nor the income effect alters the individual's utility (to a first-order approximation), but both affect government revenue. For a small increase in the marginal tax rate, the mechanical and income effects are generally beneficial,[7] while the elasticity effect potentially creates offsetting costs.

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[7] First consider the mechanical effect. Averaged over the entire population, the marginal social value of private income must equal the marginal social value of public funds (and hence the population average of $g(z)$ must equal 1) otherwise one could increase total welfare through a universal lump-sum tax or subsidy. Assuming the marginal social value of private income is declining in income (that is, $g(z)$ declines with z), the average value of $g(z)$ for workers with incomes exceeding any given z^* must therefore be less than one, which means the average value of $(1 - g(z))\,\Delta\tau\Delta z^*$ for those workers is necessarily positive. Thus, the mechanical effect is beneficial. The income effect is beneficial because the compensatory increase in work effort increases revenue. (Recall that the income effect matters only to the extent revenue changes.)

Emmanuel's decomposition is useful because, as he shows, each effect can be expressed in terms of labor supply elasticities, distributional parameters, and welfare weights. Integrating the mechanical and income effects over z (accounting for the income distribution) and setting the sum of the three effects equal to zero, he derives a version of the Mirrlees optimal tax formula expressed entirely in terms of welfare weights and measurable parameters. By reflecting on the three effects, the economic role of each parameter is clarified and understood. Emmanuel also carefully calibrates the model based on existing empirical studies and (in the case of the income distribution) direct evidence, and solves numerically for the optimal tax schedule, which turns out to be U-shaped (with high marginal tax rates at the upper and lower ends of the income distribution). Thus, in addition to being transparent, Emmanuel's solution to the Mirrlees problem builds economic intuition, lends itself to empirical implementation, and (for those of us who lecture on the subject) is eminently teachable.[8]

One clear prescription emerging from traditional analyses of the Mirrlees problem is that marginal tax rates should be positive at all income levels.[9] That result has potential implications for income support programs targeted at low-income households. Some proposals such as the negative income tax call for a substantial guaranteed income level and a relatively high marginal tax rate for the working poor. Others such as the earned income tax credit (EITC) call for a low guaranteed income level coupled with a wage *subsidy*—in effect, a negative marginal tax rate—for the working poor. Because classic results derived within the Mirrlees framework rule out the optimality of negative marginal tax rates, they argue against an EITC and favor a negative income tax. In [2], Emmanuel calls the relevance of that implication into question. He points out that, while the Mirrlees framework is a useful starting point for the study of optimal income tax and transfer policies, it is also restrictive. One important restriction is that it contemplates labor supply responses to taxes and transfers only on the intensive margin (that is, effects on the number of hours worked) and not on the extensive margin (that is, effects on whether the individual chooses to work at all). A common argument in favor of the EITC holds that wage subsidies at low levels of income are desirable because they promote labor force participation by the working poor. Because the Mirrlees model abstracts from that possibility, its implications may not be relevant for policies such as the negative income tax and EITC.

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[8] Others also deserve credit for making progress toward an empirically implementable version of the Mirrlees formula. Diamond (1998) and Piketty (1997) tackled the simpler case with no income effects; see also the earlier contributions of Revesz (1989) and Roberts (2000). Notably, Roberts also used a perturbation method, but one that was somewhat less transparent and amenable to economic interpretation.

[9] Suppose the marginal tax rate is negative over some range, and consider the welfare effects of increasing it. I have already explained that the mechanical and income effects are beneficial. If earnings are subsidized on the margin between z^* and $z^* + \Delta z^*$, then the elasticity effect is also beneficial because a reduction in labor supply for individuals with incomes in that range increases revenue. (Recall that the elasticity effect matters only to the extent revenue changes.) Thus, the increase in the marginal tax rate is unambiguously beneficial.

Emmanuel's objective in [2] is to revisit the optimal design of income tax and transfer policies within a setting that allows for labor supply responses on both the intensive and extensive margins. Building on earlier theoretical work by Diamond (1980), who studied a model in which labor supply responds to taxation only on the extensive margin (rather than only on the intensive margin, as in the Mirrlees framework), he assumes that individuals are differentiated both by their skill and by their preference for leisure so that within a given skill class they enter the labor force at different wages. His main finding is that negative marginal tax rates for the working poor are in fact optimal when two conditions are met: first, the marginal social value of private income exceeds the marginal social value of public funds at the lower end of the income spectrum;[10] second, the aggregate labor supply elasticity primarily reflects responses on the extensive margin. Consequently, Emmanuel's work identifies circumstances in which the optimal tax schedule at low levels of income looks like an EITC and not like a negative income tax. Because previous analyses of the Mirrlees problem had led most economists to believe that the EITC was inconsistent with the principles of optimal income taxation, Emmanuel's finding was remarkable.

To understand the intuition for Emmanuel's result, consider a group of low-skill workers who have the potential to earn, say, $10,000 per year in the labor force. For the purpose of this illustration, I will assume that the marginal social value of private income received by those earning only $10,000 exceeds the marginal social value of public funds. Suppose an increase in before-tax income from zero to $10,000 increases after-tax income by *less* than $10,000. Then the tax system does not maximize social welfare. To see why, consider a $1 reduction in the tax burden (or increase in the total transfer received) for those with incomes of $10,000. There are three effects on social welfare. First, a dollar is transferred from the government to each individual earning $10,000. Because the marginal social value of their private income exceeds the marginal social value of a dollar, the net effect on welfare is positive. Second, some individuals respond on the extensive margin by entering the labor force and earning $10,000. To a first-order approximation, their well-being is unchanged (because the ones who enter are approximately indifferent between working and not working); moreover, because the incremental tax applied to the first $10,000 of income is positive, the government collects more revenue. Consequently, the second effect is also welfare-enhancing. Third, some individuals respond on the intensive margin, working either more or fewer hours so that they will earn $10,000. This third effect could have adverse implications for welfare, but if labor supply is relatively inelastic on the intensive margin, the first two effects will necessarily outweigh those considerations. Thus, if the tax-transfer schedule is optimal, an increase in before-tax income from zero to $10,000 must increase after-tax income by *more* than $10,000.

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[10] This requirement is quite weak. As explained in Footnote 7, the marginal social value of private income must equal the marginal social value of public funds when averaged over the entire population. Thus, the requirement is satisfied if the marginal social value of private income is declining in income.

Never content merely to raise a theoretical possibility, Emmanuel proceeds in [2] to derive the optimal tax-transfer structure numerically for empirically reasonable parameters. His analysis favors a system with a moderate level of guaranteed income and a marginal tax rate close to zero for the working poor. High marginal tax rates further up in the income distribution recapture the income guarantee, so that the system yields a net tax rather than a net subsidy for the nonpoor.

Another restrictive feature of the Mirrlees framework is that it focuses on individuals rather than households. Given the prevalence of two-earner families as well as the prevailing practice of establishing separate tax schedules for single individuals and married couples, that restriction calls into question the practical relevance of standard optimal personal income tax analyses. A more recent example of Emmanuel's work in this general area ([3], with Henrik Kleven and Claus Kreiner) addresses the implications of two-earner households for the design of tax and transfer policies. While the prior literature had not ignored this issue entirely, other studies either required the tax schedule to be separable in the spouses' incomes (Boskin and Sheshinski, 1983; Schroyen, 2003), thereby avoiding important issues concerning interdependence, or emphasized the complexity of the resulting multidimensional screening problem without providing much in the way of general results (Brett, 2006; Cremer, Lozachmeur, and Pestieau, 2007).

In [3], Emmanuel and his coauthors consider a setting in which primary earners necessarily participate in the labor force but can vary the degree of participation continuously, while secondary earners simply choose whether or not to work. Primary earners differ according to skill, which the government cannot observe. Secondary workers differ only according to their cost of participating in the labor force (which is also private information); thus, all secondary earners receive the same income when they work. With these simplifying assumptions, the policy design problem boils down to choosing two schedules, each expressing taxes (or transfers) as functions of the primary earner's before-tax income (z), one for single-earner couples, $T_0(z)$, and one for dual-earner couples, $T_1(z)$. The problem is challenging because it involves two-dimensional screening. Even so, by imposing restrictive assumptions that are defensible as approximations (for example, that labor supply is completely income inelastic and utility is separable in the leisure of each spouse), Emmanuel and his coauthors manage to derive a number of strong results.

A central objective of [3] is to determine how the tax on one spouse should depend on the earnings of the other. The answer turns out to depend in an intuitive way on the nature of the secondary earner's labor force participation costs. On the one hand, if secondary earners differ according to the direct costs of employment, then labor force participation indicates that those costs are low, which implies that couples with working spouses are better off than those with nonworking spouses. In that case, the tax rate on the secondary earner should be positive, and the tax on each individual should decline as the earnings of the spouse rise. On the other hand, if secondary earners differ according to home productivity, then labor force participation indicates poor nonmarket skills, which implies that couples with working spouses are worse off than those with nonworking spouses. In that case, the tax rate on the secondary earner should be negative, and the tax on each

individual should increase (so that the subsidy for the secondary earner falls) as the earnings of the spouse rise.

In both cases identified in the previous paragraph, the absolute size of the tax wedge imposed on the secondary earner declines as the income of the primary earner rises; the tax shrinks in the first case, while the subsidy shrinks in the second. Perhaps the most surprising finding in [3] is that in either case, the secondary earner's tax or subsidy converges to zero as the primary earner's income becomes sufficiently large. That result is reminiscent of the classic finding that the optimal marginal income tax rate is zero at the top end of the income spectrum, but it holds for entirely different reasons. Indeed, in [3], Emmanuel and his coauthors assume the income distribution for primary earners is unbounded, and as in [1] the limiting optimal marginal tax rate for high-income primary earners is strictly positive, not zero.

To understand why the spouses of sufficiently high-income primary earners should be untaxed in this setting, suppose $T_1(z) - T_0(z)$ converges to some positive number rather than zero. Consider the following reform: within some small band of income for the primary earner, z^* to $z^* + \varepsilon$, increase slightly the marginal tax rate on z for couples with nonworking spouses and decrease slightly the corresponding rate for couples with working spouses, choosing the changes so that the reform would be revenue-neutral absent behavioral responses. There are three effects on social welfare. First, resources are redistributed from high-income single-earner couples to high-income dual-earner couples. For sufficiently high z, the marginal social value of private income is virtually the same for all such couples, so the impact on welfare is negligible. Second, labor supply changes for primary earners with incomes falling within the band affected by the reform.[11] To a first-order approximation, that response has no direct impact on welfare, but it may affect government revenue. Because $T_1(z) - T_0(z)$ converges to a constant, sufficiently high-income primary earners face virtually the same marginal tax rates irrespective of whether their spouses work. Moreover, given the assumed separability of utility and absence of income effects, any two primary earners with the same skills and marginal after-tax wage rates have the same labor supply elasticities. Thus, within the affected income band, the change in revenue resulting from the labor supply response among primary earners with nonworking spouses almost exactly offsets the change in revenue resulting from the labor supply response among primary earners with working spouses. Consequently, the second effect has a negligible impact on welfare. Third, the reform reduces the incremental tax on the income of secondary earners whose spouses earn more than z^*, thereby inducing greater labor force participation among that group. To a first-order approximation, the change in labor supply has no direct effect on welfare, but it does produce a first-order increase in revenue because $T_1(z) > T_0(z)$. The overall welfare effect of the reform is therefore positive, which implies that the tax system is not optimal. A symmetric argument rules out the possibility that $T_1(z) - T_0(z)$ converges to a

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[11] Because labor supply is assumed to be completely income-inelastic, it does not change for any primary earners with incomes falling outside the band.

negative number. Thus, in this setting, the spouses of sufficiently high-income primary workers should be untaxed.

Emmanuel and his coauthors also calibrate their model to British data on the assumption that secondary earners differ according to the direct costs of work (rather than home productivity). They find that the optimal tax schedules for primary workers are U-shaped as in [1], and that the optimal tax rates for secondary earners fall from 40 percent to roughly 10 percent as the primary earner's annual pay rises from zero to 100,000 pounds. Due to the U.K.'s family-based means-tested welfare system, that prescription is roughly consistent with actual income tax and transfer programs.

Before leaving the topic of optimal taxation, I will briefly summarize Emmanuel's other major contributions in this area. In one pair of papers, he explores the robustness of several classical results in optimal tax theory, including the uselessness of commodity taxation in the presence of optimal nonlinear income taxation when utility satisfies a condition involving separability between goods and leisure (Atkinson and Stiglitz, 1976), and the desirability of productive efficiency in second-best optimal tax environments, which implies for example that taxes on intermediate goods should be avoided (Diamond and Mirrlees, 1971). In [4], he shows that the Atkinson–Stiglitz result may not hold when preferences are heterogeneous across consumers, and identifies the key economic assumptions in that setting under which it generalizes. In [5], he reexamines some negative results due to Stiglitz (1982) and Naito (1999), who showed that if workers belong to different imperfectly substitutable skill classes, and if the government cannot condition labor income taxes on skill type, then several basic results in optimal tax theory, including the Atkinson–Stiglitz and Diamond–Mirrlees theorems, break down. He demonstrates that those results are reinstated if workers can choose their occupations, which seems a reasonable assumption for the long-run.

Another classic result from the theory of optimal taxation implies that it is inefficient to tax capital income in the long run (Chamley, 1986; Judd, 1985). However, popular wisdom holds that capital income taxation may be desirable from a distributional perspective because such income flows disproportionately to affluent households. Emmanuel explores that intuitive possibility in [6]. For a model in which taxpayers differ according to their initial wealth holdings and where those differences are exogenous (rather than related to past effort or entrepreneurism), he shows that progressive capital income taxation may be desirable in the long run. Specifically, he allows for a linear capital income tax with an exemption level and identifies conditions under which that exemption level converges to a finite limit.[12]

In another series of papers, Emmanuel broadens the set of instruments contemplated in optimal tax and transfer problems. He studies a model of tax expenditures in [7]. Individuals earn labor income and contribute a portion of it to a public good. The government levies a tax on labor income as well as a tax or subsidy on contributions and may also finance the public good directly out of

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[12] Asymptotically there is no wealth above the exempt level, so the marginal tax rate is zero for everyone, but the progressive capital income tax induces that result.

revenues. Emmanuel expresses optimal taxes and subsidies in terms of estimable elasticities and parameters reflecting the government's redistributional tastes. The optimal subsidy for contributions to the public good depends on the elasticity of contributions, the degree to which public funding crowds out private contributions, and the importance of the public good. In [8], Emmanuel and Raj Chetty examine optimal taxation and social insurance in a setting where people face risks against which private markets endogenously provide incomplete protection. They derive formulas that express optimal policies in terms of empirical elasticities for three different models of insurance market failures. In [9], Emmanuel derives conditions under which it is optimal to set a minimum wage at a level that induces unemployment, even with optimal nonlinear taxes and transfers. He also shows that when labor supply responses occur only at the extensive margin, it is inefficient to impose a binding minimum wage while taxing the incomes of low-income workers at positive rates.

Income and Wealth Inequality

The evolution of economic inequality over the course of a country's development is a topic of considerable importance. More than 50 years ago, Simon Kuznets (1953, 1955) employed published tabulations of U.S. income tax returns along with data on population and total income to estimate top income shares and track their trends over time. His work provided the foundation for the "Kuznets hypothesis," which holds that income inequality follows an inverted-U shape as a country develops, first increasing with industrialization and then declining as more and more workers join high-productivity sectors. Kuznets did not, however, have the benefit of observing trends over the last 30 years of the twentieth century, during which economic inequality in the United States is widely held to have increased sharply.

In [10], Emmanuel teamed with Thomas Piketty to update and extend Kuznets's classic analysis. In the interim, many other economists had of course studied economic inequality. However, most relied on survey data, a practice that typically limits intertemporal comparisons to shorter periods, provides scant foundation for drawing inferences concerning the very affluent, and often does not enable the analyst to distinguish separate trends for labor and capital income. Those who, in the tradition of Kuznets, employed income tax data generally focused on shorter time periods (for example, as Emmanuel did in the empirical portion of [1]).[13]

Because the tax code has changed considerably over time, the strategy of relying on data from tax returns does not entirely resolve the problem of intertemporal comparability. The analysis in [10] (a more detailed description of which can

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[13] Feenberg and Poterba (1993, 2000) also calculated top income shares for the U.S. based on tax returns, but their methods are not applicable to earlier years and consequently their analyses span shorter time periods (1950–1990 and 1960–1995, respectively). Picketty (2001) provided the first comprehensive historical analysis of top incomes based on tax data after Kuznets; his analysis, which focused on France, helped to rekindle interest in such methods.

be found in [11]) is particularly impressive in its painstaking attention to detail, and in the implementation of appropriate adjustments to ensure that the estimates of top income shares are reasonably homogenous. One notable example concerns capital gains. The published tabulations of tax return data segregate returns into categories ranked according to Adjusted Gross Income (AGI). Since 1913, the share of capital gains included in AGI has varied between 40 percent and 100 percent. Whether one wishes to define income net or gross of capital gains, one must therefore make an adjustment—either subtracting included gains or adding in excluded gains. In either case, the ranking of taxpayers may change. A failure to account for the change in ranking could produce spurious and even nonsensical results. For example, if the incomes of those falling within the top 1 percent of the AGI distribution consisted entirely of capital gains, then excluding capital gains without re-ranking would lead to the conclusion that those in the top 1 percent of the income distribution receive zero percent of total income. Kuznets made no adjustment for re-ranking because he only had access to the aggregate statistics contained in the published tax return tables. In [10], the authors make use of large micro-files of tax return data that the IRS has constructed annually since 1966, and which (fortunately) over-represent high-income taxpayers. The micro data permit them to re-rank taxpayers and to calculate annual re-ranking adjustments for the tabular data. Because those adjustments turn out to be quite stable over time, the authors apply them to the tabular data for earlier years, thus improving upon the Kuznets estimates.

The somewhat unfashionable but nevertheless critically important objective of [10] is to provide a detailed and reliable account of facts rather than to implement formal hypothesis tests or measure behavioral parameters, and indeed a fascinating picture emerges. The authors find that top income shares display a U-shaped pattern over the course of the century, contrary to the Kuznets hypothesis. Figure 1, reproduced from that paper, displays income shares for the top 0.1 percent of the income distribution in the United States, France, and the United Kingdom. They show that top capital incomes were hard hit by the Great Depression and World War II, and have never recovered. They speculate that this pattern is a consequence of progressive income and estate taxation. Top wage shares also fell during the war, but started to rise during the 1960s, and are now higher than before World War II. Thus, the U-shaped pattern of top income shares reflects a shift from capital income concentration to wage income concentration. The observed shifts seem too rapid to be explained by technological change, but no formal test of that hypothesis is offered.

Emmanuel built on [10] in a series of subsequent papers concerning the distribution of income and/or wealth. Along with various coauthors, he continued his study of the U.S. experience in [12] and [13], examined Canada in [14] and [15], Switzerland in [16], Japan in [17], and Spain in [18]. Along with Piketty and Anthony Atkinson, he also wrote an excellent survey article for the *Journal of Economic Literature* ([19]) that summarizes the key methodological issues and presents results for 22 countries (see also [20] for additional international comparisons). Notably, Emmanuel has posted spreadsheets containing the income and wealth distribution

Figure 1
Top 0.1 Percent Income Shares in the United States, France, and the United Kingdom: 1913–2007
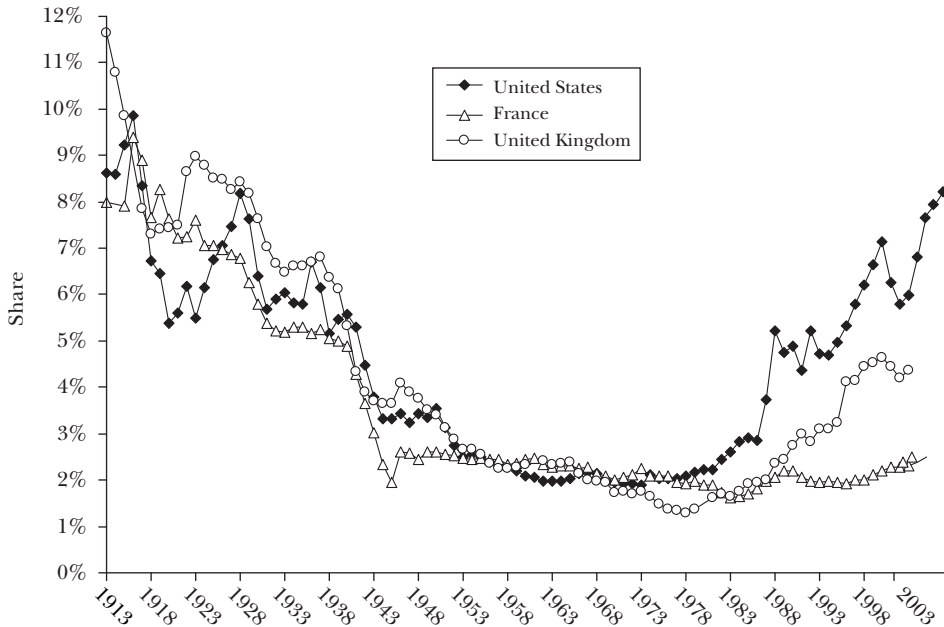
Source: Figure 12 from Piketty and Saez (2003).

data underlying all the figures and tables for these various papers on his web page, thereby creating an immensely valuable resource for other scholars.

Responses to Personal Taxation

The elasticity of taxable income with respect to a household's marginal tax rate is a critical behavioral parameter. It tells us not only how the tax rate distorts the household's decisions, but also how changes in that rate will affect revenues collected. Indeed, if taxable income is sufficiently elastic, then a government may find itself on the wrong side of the Laffer curve, where a reduction in the marginal tax rate raises revenue. Not surprisingly, [1] identifies this elasticity as one of the key inputs into optimal income tax formulas.

The response of taxable income to a change in the tax rate is an amalgam of diverse effects, for example on hours worked, job selection, forms of compensation (for instance, pensions versus current cash), types of investments, portfolio turnover, tax-deductible contributions to retirement accounts, charitable contributions, sizes of mortgages, tax avoidance, and evasion. Broadly speaking, there are two potential approaches to measuring the taxable income elasticity. One approach is to estimate taxpayers' responsiveness on each margin and aggregate. There

are indeed branches of the literature that focus on each of the aforementioned responses. Given the difficulties associated with nailing down each constituent elasticity, the other approach is to analyze taxable income rather than its components, and to estimate the overall response.

According to estimates presented in early studies by Lindsey (1987) and Feldstein (1995), taxable income is extremely sensitive to tax rates. However, the reliability of those estimates has been questioned. The main challenge in estimating the effects of marginal tax rates on decisions affecting taxable income is to find a good source of variation in tax rates. The early studies mentioned at the outset of this paragraph focused almost entirely on variation over time. Their conclusions primarily reflect the fact that tax rates for high-income individuals declined over the pertinent time periods while inequality increased, potentially for unrelated reasons. Large estimated elasticities may also reflect intertemporal shifting of taxable income rather than durable responses, which are more relevant in normative analyses.

Emmanuel has conducted a series of studies measuring the effects of changes in marginal tax rates on taxable income. Some of these studies display impressive resourcefulness and ingenuity in identifying arguably appropriate sources of variation in marginal tax rates, which Emmanuel then uses to estimate behavioral responses. He consistently finds that the response of taxable income to the marginal tax rate is considerably smaller than earlier papers in this literature imply.

In [21], Emmanuel identifies responses to marginal tax rates using the changes in these rates that occur when inflation shifts a taxpayer from one bracket to another ("bracket creep"). He studies a panel of individual tax returns for 1979 through 1981, when inflation was relatively high. With a progressive rate schedule, bracket creep implies that households at the top ends of tax brackets will on average have higher marginal tax rates in the following year than households in the middle or at the bottom of those brackets. Thus, Emmanuel effectively uses households at the top ends of tax brackets as treatment groups and households in the middle or at the bottom of brackets as control groups. Formally, he examines the relation between the change in a household's taxable income and the projected change in its marginal tax rate, which he infers from its proximity to the next tax bracket.[14] According to his estimates, the overall taxable income elasticity is relatively low— approximately 0.3.

Emmanuel's method of identifying the responsiveness of taxable income to the marginal tax rate has several notable advantages. Because the treatment and control groups are interleaved, the taxable income elasticity is identified by comparing fundamentally similar households. Unrelated factors that contributed to increasing income inequality over time cannot explain why the incomes of those near the top of a tax bracket would have fallen relative to the incomes of those with both slightly lower and slightly higher incomes. Emmanuel's method also allows

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[14] Notably, this procedure identifies the *compensated* elasticity of taxable income (at least approximately), because bracket creep causes the budget constraint of a taxpayer at the top end of a tax bracket to pivot locally near the chosen bundle.

him to focus on years when no major tax reforms took place, which ensures that the definition of taxable income is comparable across years, and rules out other potential causes of behavioral responses.

While the approach presents clear advantages, it also raises a few concerns. First, changes in marginal tax rates resulting from bracket creep may not be sufficiently salient to catch taxpayers' attention. After all, those changes were relatively small (at least compared with tax reforms), person-specific, and did not result from publicized legislative action. It is therefore possible that many taxpayers were unaware of the precise effects of inflation on their own marginal tax rates. Plainly, Emmanuel's approach presupposes a high degree of awareness and sophistication among taxpayers. Second, changes in taxable income between consecutive years reflect short-run responses. Taxpayers may adjust their activities incrementally over time as their incentives change, and some may simply take longer to adjust than others. Third, because the changes in marginal tax rates are small, the parameter of interest is difficult to identify with precision. All three considerations could contribute to the low estimated taxable income elasticity.

In [22], Emmanuel exploits the fact that changes in marginal tax rates between consecutive tax brackets, as well as the rules governing the Earned Income Tax Credit, create kink points in the schedule relating income before taxes and transfers to income after taxes and transfers, and that the degree of bunching at those kink points depends on the responsiveness of taxable income to the marginal tax rate. Say the marginal tax rate increases from t_0 to t_1 when pretax income reaches Y^*. Taxpayers' pretax incomes should tend to bunch at Y^* because some of the taxpayers who would earn more than Y^* if the tax rate were fixed at t_0 reduce their taxable income to Y^* when the tax rate on income in excess of Y^* rises to t_1. When taxable income is more responsive to the marginal tax rate, more taxpayers will reduce their taxable income to Y^*, and greater bunching will occur. Consequently, as shown formally in [22], it is possible to infer the elasticity of taxable income from the degree of bunching at kink points in the tax schedule.

Emmanuel studies a large sample of tax returns filed between 1960 and 2004. He finds strong evidence that taxpayers bunch at the first kink point associated with the Earned Income Tax Credit, as well as at the threshold of the first tax bracket where tax liability starts. In both cases, the modest degree of bunching implies a low taxable income elasticity, in the range of 0.2 to 0.25. Strikingly, bunching is absent at kink-points in the tax schedule associated with higher levels of income. Notably, bunching at the EITC kink point results from the responsiveness of self-employment income and consequently may reflect effects on reporting, rather than true earnings. To a significant extent, bunching at the lowest kink point for the tax schedule results from changes in itemized deductions. There is very little evidence that labor income responds to the marginal tax rate.

Emmanuel hypothesizes that his results may reflect the salience of marginal tax rates. The kink-point from the Earned Income Tax Credit may be focal because it is the level of earnings that maximizes the tax refund. Notably, the extent of bunching at the EITC kink point increased since 1996 while the rules governing the EITC remained stable, which suggests that taxpayers learned those rules gradually.

Arguably, the level of income at which tax liability starts is also particularly visible. However, taxpayers may pay considerably less attention to other details concerning the tax schedule, and indeed survey evidence indicates that most do not know their marginal tax rates (Fujii and Hawley, 1988). While the evidence is only suggestive, [22] is often credited with stimulating much of the recent interest in the topic of tax salience.[15]

In [24], Emmanuel and Jonathan Gruber attacked the problem of estimating taxable income elasticities from yet another angle. This is Emmanuel's most widely cited work on the subject, but it is also the most conventional from a methodological perspective. Using panel data from tax returns filed between 1979 and 1990, they relate changes in income over three-year intervals to changes in marginal tax rates. The time period is noteworthy because it spans a number of significant tax reforms, including the Economic Recovery and Tax Act of 1981, the Tax Reform Act of 1986, and the 1987 increase in the Earned Income Tax Credit, as well as many changes in state-level income taxes. Because a household's income determines its tax bracket, the marginal tax rate is obviously endogenous. The authors therefore instrument for the change in marginal tax rate using the change that would have occurred if the household's real income had remained fixed. Their specifications also control separately for income effects associated with changes in the tax code[16] as well as for initial income to remove any spurious effects associated either with the general trend toward widening of the income distribution or with mean reversion. Their results point to an overall taxable income elasticity in the neighborhood of 0.4, but the response appears to be concentrated among itemizers and is stronger among households with incomes over $100,000 (for whom the estimated elasticity is nearly 0.6).[17] They also find a smaller elasticity (less than 0.2) for a broader notion of income (one that does not, for example, net out itemized deductions). According to the optimal tax formulas derived in [1], it follows that broadening the income tax base would reduce deadweight losses and allow for greater progressivity.

In his most recent empirical work on personal taxation, Emmanuel has branched out into field experiments. In [25], he and Raj Chetty show that the provision of personalized information concerning the Earned Income Tax Credit schedule to low-income households by tax professionals at H&R Block had a large effect on earnings and EITC refunds (comparable to a 33 percent expansion of the EITC program). In [26], he and several coauthors study a large randomized tax-enforcement experiment in Denmark. They find evidence of substantial evasion for self-reported income (though not for income reported by third parties). They show that the degree of evasion is responsive to prior audits, "threat-of-audit" letters,

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[15] Despite its publication date, the NBER working paper version of [22] was circulated in 1999 (as [23]), and consequently it predates several other well-known papers on tax salience, like Chetty, Looney, and Kroft (2009) and Finkelstein (2009).

[16] Specifically, they control for the change in after-tax income, instrumenting with the change that would have been observed if pre-tax income had remained constant in real terms.

[17] The fact that the response is concentrated among itemizers suggests that the tax rate primarily affects deductions (for example, charitable contributions) rather than earnings. The normative implications of a given taxable income elasticity may differ according to locus of the response.

and the probability of audit expressed in those letters (all of which were assigned randomly). From an examination of bunching at kink points in the tax schedule, they infer that evasion is also modestly responsive to marginal tax rates.

Emmanuel has also recently turned his attention to the issue of taxation and labor mobility. In [27], he teamed with Henrik Kleven and Camille Landais to study the effect of taxation on the migration decisions of professional soccer players across European countries. Focusing on top tax rates and country-specific provisions offering lower tax rates for immigrant football players, they show that taxation does indeed have a large effect on migration decisions, particularly among younger players and stars.

Taxation and Corporate Payout Policy

Under the U.S. tax code, households pay tax on dividends received from corporations. A change in dividend taxation potentially alters a corporation's incentives, and can in principle lead it to modify its capital structure, retentions, investments, and payouts. One branch of the empirical literature on the taxation of corporate income focuses on the relationship between dividend taxation and dividend payout. In principle, knowledge of that relationship can help differentiate between competing theories of corporate payout policy and shed light on the incidence and efficiency effects of various taxes on income from corporate sources (including the dividend tax, the capital gains tax, and the corporate income tax).

The simplest intuition would suggest that an increase in the dividend tax rate would render dividends less attractive and thus induce companies to reduce their dividends, but that implication does not necessarily follow for all theories of corporate payout policy. For example, under the "tax capitalization" theory of King (1977), Auerbach (1979), and Bradford (1981), wherein marginal investments are financed by retained earnings, a permanent dividend tax has no effect on either investment or dividends, because such a tax collects the same proportion of corporate-source income regardless of whether funds are distributed immediately or invested and distributed later. Alternatively, to explain why companies pay dividends (rather than repurchase shares) despite tax disadvantages, economists sometimes assume that investors view after-tax dividend income as an imperfect substitute for other forms of after-tax income (possibly for psychological reasons, as in Shefrin and Statman, 1984). In that case, dividends represent *expenditures* on after-tax dividend income, and an increase in the price of after-tax dividend income (due to an increase in the tax rate) can cause those expenditures to either rise or fall. Thus, as a theoretical matter, one cannot presume that a higher dividend tax reduces dividends, let alone that the effect is substantial.

The rate of dividend taxation (relative to capital gains taxation) varies not only over time but also across firms, due to the fact that different firms have different investor clienteles. The cross-firm variation is not, however, particularly useful for the purpose of estimating the effects of dividend taxation on dividend payout, both because it is difficult to measure and because it depends critically on the

company's dividend policy (that is, the shares of companies that pay high dividends are more attractive to investors with low dividend tax rates). Thus, the literature tends to focus on the time-series relationship between aggregate dividends and a measure of the relative tax treatment of dividends and capital gains (for example, Poterba and Summers, 1985; Poterba, 2004).

Until 2003, dividends were taxed at the same rate as ordinary personal income under the U.S. tax code. The relative tax treatment of dividends and capital gains changed over time only when Congress modified the personal income tax schedule or adjusted the treatment of capital gains. In contrast, the Jobs and Growth Tax Relief Reconciliation Act of 2003 dramatically reduced the tax rate for corporate dividends relative to virtually all other forms of personal income. As a result of the 2003 Act, dividends (like capital gains) were taxed at a flat rate of 15 percent (retro-active to the start of 2003, when the policy was proposed) rather than at the rates applicable to ordinary personal income, which topped out at 35 percent. Thus, the 2003 reform provides a unique opportunity to study the effect of dividend taxation on corporate payout policy.

In [28], Emmanuel and Raj Chetty examine firm-level data on dividend payments through the second quarter of 2004 to evaluate the effect of the 2003 tax reform on corporate payouts. Their findings are striking. After declining steadily for roughly two decades, the fraction of firms paying dividends surged from a low of 20 percent in the fourth quarter of 2002 to 25 percent in the second quarter of 2004. Dividend-paying companies also augmented their dividends, leading aggre-gate dividends to rise by roughly 20 percent. To rule out the possibility that the documented changes resulted from spurious third factors rather than the dividend tax reform, the authors separately examine corporations whose largest share-holders were nontaxable institutions such as pension funds, and find that their dividends did not increase. They also reject the hypothesis that corporations simply substituted from share repurchases to dividends; on the contrary, total corporate payouts rose significantly as a result of the 2003 act.

The data reported in [28] also show that firms were more likely to initiate divi-dends if top executives held large ownership shares, and were more likely to raise dividends if taxable institutions held large shares or if large independent share-holders were represented on the Board of Directors. Emmanuel and Raj suggest that those findings point toward an agency theory of corporate payout in the spirit of Jensen and Meckling (1976) and Jensen (1986).

In [29], Emmanuel and Raj provide a formal justification for the view that the cross-sectional patterns of dividend changes documented in [28] are consis-tent with an agency theory of dividends. They envision a corporation operating in two periods. It has earnings from past investments which managers can choose to invest, spend on perks, or pay out as dividends. Managers receive some private benefit from perks, but also own some share of the firm, and consequently care about its performance. Investments yield returns in the following period, which are distributed to shareholders. The Board can monitor managers at some cost. The private benefits managers receive from perks, and hence the level of perks, decline as the intensity of monitoring increases. The Board chooses the

intensity of monitoring optimally, and its choice naturally depends on its fractional ownership.

In this setting, a reduction in the dividend tax rate increases the benefits of monitoring, and consequently induces the Board to monitor more intensely. Management shifts resources away from perks both because the relative benefits of immediate and delayed dividends rise and because the benefits of perks fall along with the increase in monitoring. Accordingly, more firms pay dividends in the first period. Dividends also rise among dividend-paying firms, and the increase just offsets the reduction in perks, so that investment is unaffected. However, among non-dividend-paying firms, the reduction in perks leads to greater investment. With some further restrictions, the model also accounts for the cross-sectional findings in [28]. Intuitively, when managers place more weight on profit maximization (either because the manager owns a large number of shares or because there are more large shareholders), their incentives are more sensitive to the dividend tax, and they are therefore more likely to increase dividends in response to a tax cut.

The analysis in [29] also has provocative efficiency implications. Unless management's ownership share is chosen to optimize incentives, a small dividend tax can create a first-order welfare loss. In contrast, within this model, the corporate income tax does not create additional incentives for waste. Therefore, it may be preferable to establish a corporate income tax rather than to tax corporate-source income after it is distributed. However, that finding presupposes that spending on perks is not tax-deductible at the corporate level.

Saving for Retirement

Emmanuel has written a series of papers on retirement saving that explore the influences of factors such as employer-provided financial education, professional advice, peer groups, social networks, and informational framing. These factors may well be important because decisions pertaining to retirement planning are complex. Those lacking the training or skill to make good decisions may look to employers, coworkers, and/or financial professionals for guidance, and may be particularly susceptible to "spin" rather than substance.

The earliest studies of the behavioral effects of financial education in the workplace relied on naturally occurring variation in the availability of such education across employers (Bernheim and Garrett, 2003; Bayer, Bernheim, and Scholz, 1996). Plainly, an employer's decision to offer an educational program is endogenous, and there is some evidence that these programs are adopted for remedial purposes when participation in a company's pension plan is low. Thus, cross-sectional covariation between retirement saving and the availability of financial education through the workplace probably understates the true treatment effects.

One natural solution to the aforementioned endogeneity problem is to create random variation in the availability of financial education within the context of a controlled field experiment, which is what Emmanuel and Esther Duflo do in [30]. Randomly selected employees in some departments of a major university

were provided with monetary incentives to attend a benefits information fair that was open to all employees. The stated goal of the fair was to increase participation in the university's Tax Deferred Account retirement plan by explaining its advantages. The incentives increased attendance of the targeted employees by a factor of five, and of untreated employees in the same departments (who may have been influenced by their targeted coworkers) by a factor of three. Enrollment in Tax Deferred Accounts was significantly higher five and eleven months later in departments where some individuals were treated. Surprisingly, the measured effect on enrollment within such departments was roughly the same for treated and untreated individuals. Thus, the study finds that information programs have strong effects on enrollment decisions, and raises the interesting possibility that these effects are transmitted in part through social channels. The apparent importance of peer effects is consistent with nonexperimental evidence that Emmanuel and Esther report in [31].

In [32], Emmanuel and several coauthors describe a large-scale field experiment, the results of which suggest (among other things) that the effects of financial incentives for retirement saving may depend on informational packaging. In the experiment, all H&R Block clients at offices serving low- and middle-income neighborhoods of St. Louis during a one-month period in 2005 were assigned one of three match rates for IRA contributions to an H&R Block Express IRA (X-IRA): 0, 20 percent, or 50 percent. Higher match rates led to significantly higher take-up rates, average contributions conditional on take-up, and overall average contributions. Using a nonexperimental difference-in-difference approach, Emmanuel and his coauthors also estimated the effects of the Saver's Credit, which provides nonrefundable tax credits on the first $2,000 of IRA contributions for low-income individuals (at rates of 50, 20, or 10 percent depending on Adjusted Gross Income). They found that the experimental effects of the matching contributions were substantially greater than the estimated effects of an economically equivalent Saver's Credit. They speculated that the difference is potentially attributable to the greater transparency of the matching contributions and to the fact that the benefits of the Saver's Credit are received less directly (as a tax break rather than as a deposit into a taxpayer-owned savings account). Of course, it is also possible that the discrepancy is partially or even entirely attributable to the different methods used in measuring the effects of the two programs.

To determine whether informational packaging does in fact have an effect on taxpayers' responses to financial incentives for retirement saving, Emmanuel conducted a second randomized field experiment in cooperation with H&R Block, reported in [33]. Subjects were randomly assigned to a treatment group, which received a 50 percent match on IRA contributions, or a control group, which received no match. For a randomly selected subset of the treatment group, the 50 percent match was described as a 33 percent credit with a cash-back rebate (which is economically equivalent). Some subjects received advance notification of their opportunities while some did not. Some members of the treatment group were also offered matches on future monthly contributions to their IRA accounts. Emmanuel finds that the subsidies raise take-up and contributions, with significantly larger effects when the

subsidy is characterized as a matching contribution rather than an economically equivalent credit and when filers are informed in advance about the subsidy. The opportunity to receive matches on future monthly contributions had no discernable effect. Emmanuel concludes that both pure incentives and the presentation of those incentives affect consumer choices.

Concluding Remarks

Since receiving his Ph.D. from MIT in 1999, Emmanuel Saez has deliberately and creatively pursued a compelling vision for a broad swath of public economics. His work has stimulated a remarkable resurgence of interest in tax policy research over the last decade, and currently dominates Ph.D.-level reading lists in public economics to a greater extent than that of any other economist of his generation.

As exemplified by his most recent work on the taxation of corporate dividends and retirement saving, Emmanuel has periodically shifted and broadened the scope of his research interests, turning not only to new topics, but also to new methods, such as inventive field experiments. While it is difficult to predict where his inquisitive and incisive intellect will take him, we will no doubt continue to benefit from his seriousness of purpose and profound insight.

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