

**The Rising-Tide Tax System:
Indexing (at Least Partially) for Changes in Inequality**

By Leonard E. Burman
Co-Director, Tax Policy Center

Jeffrey Rohaly
Director of Modeling, Tax Policy Center

and

Robert J. Shiller
Professor of Economics, Yale University

"A rising tide lifts all boats."

President John F. Kennedy
Remarks in Pueblo, Colorado, August 17, 1962,
Public Papers of the Presidents: 1962, p. 626.

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Abstract

Based on experience over the past three decades, growing inequality appears to be a serious risk. A change in the tax system to index against changes in inequality is motivated both by financial theory and by classical welfare economics. Inequality indexation would insure, at least partially, against future increases in after-tax inequality. Tax rates would endogenously adjust to changes in inequality. We develop a method of implementing the system using U.S. tax returns data and the Tax Policy Microsimulation Model. We study the outcomes if inequality indexation had been begun in 1979, or 1994. Distributive effects and incentive effects are described.

The Rising-Tide Tax System Indexing (at Least Partially) for Changes in Inequality

John F. Kennedy said in 1962, “A rising tide lifts all boats.” JFK’s metaphor was an argument for pro-growth policies. In principle, economic growth can help everyone, not just the rich, by making the size of the economic pie bigger. But, despite robust economic growth in the United States over the past four decades, income growth for the bottom 80 percent of households has lagged far behind growth at the top of the income scale. The rising tide of national income has not lifted all segments of the population, and there is certainly no guarantee that it will do so in the future, unless we adopt policies to make it happen.

Aside from its importance as a revenue-raising apparatus, the tax system plays a key role in ameliorating the market’s skewed distribution of income. According to the Congressional Budget Office, the top 1 percent of U. S. households earned 13.4 percent of income in 2002 before tax, but 11.4 percent after tax. The top 20 percent had 51.5 percent of pre-tax income, but 48.0 percent of after-tax income. And, while the bottom 40 percent of households earned only 13.5 percent of income before tax, their share increased to 15.5 percent after taxes (and tax credits) were considered.

Although the tax cuts enacted since 2001 have tended to undermine the progressivity of the tax system, we argue that the tax system can improve economic welfare—even among those currently sitting at the top of the income distribution—by serving as a brake on further deterioration of the income distribution.

Our rising-tide tax system proposal would index taxes for inequality. In its purest form, such indexation would provide today that in future years income tax rates and

credits would be automatically adjusted regularly so that the percentage distribution of after-tax income remains fixed at a target level. If pre-tax inequality increases, then taxes automatically get more progressive. If inequality decreases, then the tax system automatically becomes less progressive.

For example, if the legislation chose 2002 as the target, the proposal could be that the top 1 percent of U.S. households could not earn more than 11.4 percent of income after tax, its 2002 share, in any future year. Individuals could still rise or fall in the income distribution over time, and we can all become richer when the economy grows. The legislation would merely adopt a rule for future years that instructs the Internal Revenue Service to find a tax schedule each year that would fix the *concentration* of income among high-income people.

Given economic and political constraints, the ideal level of indexation may be less than 100 percent (just as, in some markets, less than full insurance is optimal). In that case, the system might not guarantee the target level, but instead move a specified fraction of the way toward the target, thereby partially protecting against worsening inequality.

Whether full or not, this inequality indexation proposal has several motivations. First, increasing inequality is a fundamentally important concern of our time. There is a risk that the economic system will change so that it becomes more of a “winner-take-all” economy, with a small number of very rich people and many more poor and struggling families. The risk may be heightened by the rapid growth of information technology, which is augmenting or replacing the human mind in economic activities at an increasing rate, by the globalization of competition, and by our increasingly free-enterprise laws and

mores. In addition, to the extent that inequality in economic outcomes is related to social problems such as extreme poverty, crime, poor educational outcomes, and drug use, improving the income distribution can benefit everyone. Indeed, as Lester Thurow (1971) argued, the income distribution has the nature of a pure public good—everyone benefits from a more equal distribution, and everyone pays the price of a less equal one. Thus, government can raise aggregate welfare by improving the distribution of income.

Second, a little-known feature of the progressive income tax is that it serves as a kind of insurance mechanism. To the extent that the value of additional dollars of income tends to decline as income increases, individuals with uncertain incomes would prefer a progressive income tax to a lump-sum tax or proportional income tax because the progressive tax effectively insures against poor economic outcomes (with the cost being increasing shares of income when outcomes are good). (Kniesner and Ziliak, 2002)

Shiller (2005) carried this concept a step further. He argues that individuals cannot insure against secular changes in the distribution of income. Thus, they would be willing to pay to reduce the uncertainty surrounding future economic outcomes by pooling risks across income strata. That is, someone in the top quintile and someone in the bottom quintile might agree to share future gains in pre-tax income equally rather than take their chances that their own group will do better than average.

In addition, to the extent that people move across income strata, this pooling arrangement has the added advantage of reducing the volatility of after-tax income relative to before-tax income.

Finally, by guaranteeing that households at all income strata share in the gains from economic growth, the policy may induce the majority of voters in a democracy to

endorse policies that cause the economy to grow, but may not necessarily benefit their particular economic class. That is why we call this the rising-tide tax system: inequality indexation guarantees that a rising tide *actually will* raise all boats, not just the yachts. As a result, it may help build a social consensus in favor of pro-growth economic policies.

This paper develops a method that the Internal Revenue Service could apply to adjust the tax system to hit targets for the after-tax distribution of income constant. The paper also discusses economic, administrative, and political aspects of such a scheme, and simulates the effect of implementation on tax rates, economic incentives, and the distribution of tax liabilities, using historical experience as the basis for examination. Finally, the paper discusses some variants on the basic framework.

Argument for Inequality Indexation

A Very Unequal Income Distribution is a Problem

A very unequal distribution of incomes may have economic costs. Alesina and Rodrik (1992) concluded based on a cross country comparison that growth rates decline as the share of national income going to the top 5 percent and top 20 percent of earners increases. Persson and Tabellini (1994) develop a theoretical argument for why inequality should be negatively related with economic growth: more inequality results in redistributive policies that stifle economic incentives and hamper the economy. They conclude that a historical panel of data from nine countries is consistent with the predictions of the theoretical model.

However, others have argued that at least some inequality creates economic incentives that spur growth. Economists back to Adam Smith have argued that inequality stems at least in part from voluntary life choices, such as working longer hours or in a more demanding job, and it would be inefficient to distort those choices.¹ Rosen (1997) goes on to illustrate cases in which people facing a limited number of high-cost and low-cost alternatives might gamble for the chance to consume the high-cost lifestyle. In this situation, people would voluntarily move from the interior of the income distribution to the extremes. Rosen calls this “manufactured inequality” because it arises from voluntary choices of citizens.

Forbes (2000) surveyed the empirical evidence and concluded that although there was an emerging consensus that inequality reduced economic growth, the evidence supporting that conclusion was flawed by measurement error and omitted variable bias. When she used corrected data and panel date estimation techniques to remove the effect of missing country-specific variables, the sign of the relationship between inequality and growth changed while remaining strongly statistically significant. She concluded that, at least in the short- to medium-term, “an increase in a country’s level of income inequality has a significant positive relationship with subsequent economic growth.” (p. 885) She cautions that her panel is not long enough to draw firm conclusions about the effect of inequality on growth over the long run.

Thurow (1970) argues that the income distribution meets all the tests of a pure public good: all members in society face the same income distribution.² The benefits of a

¹ Cited in Rosen (1997).

² Its consumption is nonexclusive and nonrival. And, as for all public goods, individuals have no incentive to reveal how much they would be willing to pay to improve the income distribution (Thurow, p. 329).

more equal income distribution might include a sense of distributive justice (i.e., people feel better if they feel that resources are shared more broadly), but also pure self-interest—less crime, fewer panhandlers, etc. Thus income redistribution may be desirable on efficiency grounds because the income distribution is an argument in individual utility functions, and a “better” income distribution creates positive externalities.

Attitudes towards inequality

Ever since the early days of the American republic, taxation has reflected communal values about fair distributions of tax burdens (Brownlee 2000, p. 31).³ As early as 1798, a progressive property tax was employed to finance the naval buildup against France (Brownlee 2000, p. 32). The federal government first assessed an income tax to finance the Civil War (Brownlee 2000, p. 34). However, it was not until the end of the 19th century when the easing of tax burdens borne by the rich coincided with the 1890’s depression that support for using the tax code to redistribute income and wealth took hold (Brownlee 2000, p. 37). A progressive tax on corporate profits and the incomes of the very wealthy was enacted, after much rhetoric about the government’s responsibility to punish and discourage special privilege (Brownlee 2000, p. 36). The tax was declared unconstitutional, but the Sixteenth Amendment was passed in 1913, legalizing a federal income tax. Between then and 1917, there was a decided increase in the concentration of incomes and added focus on using the tax system as a tool of redistribution (Brownlee 2000, p. 42). However, with the Republican ascension to power in 1921, substantial,

³ Even earlier, Adam Smith endorsed the notion of progressive taxation in *The Wealth of Nations*, writing “it is not very unreasonable that the rich should contribute to the public expense, not only in proportion to their revenue, but something more than in proportion.” (Quoted in Brownlee 2000, p. 31).

across-the-board tax reductions in taxes on corporations and the rich were enacted (Brownlee 2000, p. 47). Treasury Secretary Mellon advocated the tax cuts on the basis of supply-side arguments (Brownlee 2000, p. 48) rather than opposition to progressivity.

The pendulum swung again during the depression and the implementation of the New Deal. Roosevelt sought “to restrain the growth of unwholesome and sterile accumulations [of wealth] and to lay the burdens of Government where they can best be carried,” but his avowed goals went further, namely “to create a broader range of opportunity” (Brownlee 2000, p. 52). World War II converted the income tax from a “class tax”—affecting a small percentage of high-income taxpayers—into a “mass tax,” affecting most wage earners—an expansion made possible by the innovation of payroll tax withholding. By the end of the war, there was bipartisan agreement on the essentials of tax policy, rejecting both progressive assaults on corporations and regressive taxes on consumption (Brownlee 2000, p. 60).

Though established through the democratic process, there is widespread dissatisfaction with the tax code. When asked in a 2002 National Election Study survey, almost half of all respondents felt they paid too much in federal income taxes and more than half thought rich people paid too little (Bartels 2003, p. 42).⁴ Similarly, a 2003 Kaiser/NPR/Harvard poll found 51 percent of respondents thought middle-income groups face the highest average burden (Penner 2004, p. 10).

Public ignorance about tax policy is pervasive, however. In the 2002 National Election Study survey, more than 40 percent of respondents admitted the 2001 tax cut

⁴ However, when a 1995 Roper Center/Reader’s Digest survey asked about the highest combined federal, state, and local tax burden it would be fair to impose on a family of four with \$200,000 of income, the mean response was 27 percent and the median was 25 percent—not much different from the actual level (Penner 2004, p. 10).

was something they “haven’t thought about” (Bartels 2003, p. 44) and 69 percent of those who favored abolishing the estate tax (57 percent of the sample) felt so inclined because it might affect them someday (Bartels 2003, p. 26).⁵ When the Kaiser/NPR/Harvard (2003) poll asked about the term “progressive taxes,” 59 percent of respondents had not heard of it, and another 23 percent, though recognizing the phrase, did not know what it meant (Penner 2004, p. 10).

Data on whether the public is aware of and sensitive to increasing income inequality yields mixed conclusions. The results from periodic Gallup polls between 1984 and 1996 are relatively stable: approximately 30 percent felt the (then) current distribution of income and wealth was fair while 60 percent would have liked to see a more even distribution (Ladd and Bowman 1998, p. 110). Yet a 1980 survey by Kluegel and Smith (1986) found 38 percent of respondents would want more equality than there was then (Ladd and Bowman 1998, p. 110).⁶ By almost all accounts, income inequality increased between Kluegel and Smith’s 1980 survey and the 1984-1996 Gallup polls, yet the survey responses do not change substantially.

By the 2003 National Election Study survey, most of the public had concluded that inequality had increased. Although 25 percent of respondents did not recognize increasing inequality, 75 percent said the difference in income between rich and poor was larger than 20 years earlier, and 40 percent said it was much larger (Bartels 2003, p. 7). However, when asked whether increasing inequality was a bad thing, 50 percent had not

⁵ Slemrod (2004) notes that at current levels of the exemption, the estate tax applies to about 2 percent of decedents (Slemrod 2004, p. 9). The results in the Kaiser/NPR/Harvard study are equally startling: fully 82 percent favored eliminating the estate tax (Slemrod 2004, p. 8) and 49 percent of respondents says that most families have to pay it (Slemrod 2004, p. 9).

⁶ The poll also found 52 percent supported the status quo and 7 percent desired less equality (Ladd and Bowman 1998, p. 110).

thought about it or did not know, and 7 percent thought it was a good thing (Bartels 2003, p. 40).⁷ Results such as these led Bartels to conclude, “most Americans support tax cuts not because they are indifferent to economic inequality, but because they largely fail to connect inequality and public policy” (Bartels 2003, p. 4).⁸

Evidence on Worsening Inequality

Evidence suggests inequality could continue to worsen. Recent increases in inequality appear to be associated with major trends that show no signs of stopping.

Goldin and Margo (1992) found that inequality in the United States was decreasing from 1930 to 1970 but increasing between 1970 and 1990. They explained the U-shaped pattern of inequality as due to the rise and fall of unionization, the decline and recovery of immigration, and the decline and recovery in the share of international trade. There is no sign of a reversal of these trends since 1970.

Much of the discussion of the rise in inequality since 1990 has focused on skill-based technical change, that rewards the more capable workers, and, most recently, on the effects of new information technology that fosters replication and dissemination, increasing the rewards to the most-skilled workers.

⁷ The public is similarly ambiguous when asked about what causes inequality. Though opportunity for education looms largest, followed closely by self-selection in terms of work effort, there is general belief in a mix of societal and personal factors with no dominant cause (Bartels 2003, p. 41). Importantly, respondents think the role of government is less important in explaining economic inequality than educational opportunities, work effort, innate ability to learn and discrimination, ahead of just self-selection in job choice and “God made people different from one another” (Bartels 2003, p. 41).

⁸ That is, an explanation for conflicting responses lies in “misplaced self-interest” (Bartels 2003, p. 21). An alternate explanation may lie in Hochschild’s (1981) finding that rich and poor respondents “define political freedom as strict equality, but economic freedom as an equal chance to become unequal” (p. 278) (p. 278, cited in Bartels 2003, p. 5). The Council of Economic Advisers (2003) cite data showing considerable movement up and down the income structure, though downward mobility seems to be more extreme than upward mobility (Penner 2004, p. 12).

Autor, Katz and Kearney (2005) find that after 1987, hourly earnings inequality increases became especially favorable to the top ten percent of earners. They conclude that the factors described by Goldin and Margo and skill-based technical change do not seem to explain this, and they resort instead to factors that lead to a polarization of the labor market. They draw on work of Autor, Levy and Murnane (2003) that computerization may be a cause of polarization, by raising the relative demand for scarce cognitive and interpersonal skills; see also Levy and Murnane (2004).

Dew-Becker and Gordon (2005) find that the growth of labor productivity in the United States 1966-2001 was not shared equally by all workers. In fact, growth of real wage and salary income equal to or above the growth rate of economy-wide productivity over this period was confined to the top ten percent of the income distribution. The authors concluded that skill-based technical change is not the most likely explanation of this concentration of rewards. They attributed rising inequality at least in part to “the economics of superstars where technology has broadened audiences and increased the rewards for the very best as compared with the next best.” (p. 61)

If these conclusions are correct, then this raises serious concerns about the future, because information technology continues to evolve in ways that broaden audiences and market opportunities for superstars and lead to further polarization of the income distribution.

The rising wage inequality experienced in the United States between 1967 and 1996 was not caused by differences in propensity to work (Heathcote et al., 2004).

The increase in consumption inequality has been less severe than income inequality (Heathcote, Storesletten and Violante 2004). People may use various methods

to smooth their consumption over time. In years of low income, they postpone durable goods purchases; the cyclical volatility of durable goods consumption in the National Income and Product Accounts is evidence of this. They also postpone maintenance and repairs on their homes in bad years (Gyourko and Tracy 2003). But some of these attempts to smooth consumption may have a long-term nature that suggests risks ahead. The gradual decline in the personal saving rate since 1980, to negative values in 2005, suggests that people who find themselves not keeping up with the economic growth that they see around them are betting on some improvement in their economic status in future decades. There could be important consequences if this does not happen (Iacoviello 2005). Personal bankruptcy rates have been climbing, apparently related wishful thinking that encourages people to try to try too hard to mimic the consumption patterns of richer people (Sullivan Warren and Westbrook, 2001).

Risk Management Theory

Our progressive income tax system is an important risk-managing institution, insuring individuals against unlucky draws in their economic status by collecting from people with high income outcomes (Moss 2004). When viewed from the perspective of a young person, who has not yet learned how he or she will fare in the economy, or when viewed from the “original position,” described by philosopher John Rawls, the progressive tax system is a preeminent risk management system. In Rawlsian philosophy, as clarified by economist John Harsanyi, there is only a fine line between risk management motivation and moral motivation, for what is often described as altruism is

really an act of viewing the situation from the original position, as a matter of sharing risks with others.

Rawlsian logic implies that people would pay for this kind of insurance before they knew their actual position. Since asking people to make their decision before they know their actual position is infeasible, such insurance could only be sponsored by the government.

By the very fact that we are uncertain about the future course of the Lorenz curve, inequality indexation is best thought of as risk management or, in rough terms, as a form of insurance. If people already knew the future, already knew whether they would be richer or poorer, it would not be risk management. It would be redistribution.

Consider a simplified economy in which there are two kinds of people—rich and poor—and one group will see a 10 percent rise in income while the other will experience no change. There is no way to predict in advance who will gain. Suppose there are 1,000 poor people who each earn \$10,000 and 10 rich people who each earn \$1,000,000. Thus each group earns half of total income (\$10 million each). Unless they like gambling, it would be in both groups' interests to agree to share any gains to their income. That is, half of gains of the winners will be taxed away and transferred to the losers so they will both be guaranteed a five percent income gain. (Risk averse people would always prefer a sure 5 percent return to 50-50 chance of earning 10 percent.) This tax would then be more progressive if the rich win, less progressive if the poor win. That is why the idea of pegging the income distribution was originally called “inequality insurance” (Shiller 2003).

It is critical to bear this in mind when considering the motivation for inequality indexation. This is not a Robin Hood proposal to steal from the rich and give to the poor. Moreover, the premise is not that inequality is a bad thing that we want to get rid of. The idea is instead that there is a target level of inequality. Some inequality is indeed a good thing, for without it there can be no effective economic incentives to work harder, save, etc. Indeed, if the nature of the economy were to change so as to make incomes too equal, then the inequality insurance would actively reverse that, making the tax system less progressive. Moreover, the effects of inequality indexation are not to move us monotonically towards a more equal world. There is no ideal expressed or implied here that we will one day have perfect income equality.

A Compensation Mechanism

Economists J.R. Hicks and Nicholas Kaldor argued in the 1930s that economic policies for which the benefits exceed the costs were desirable, even if the people who receive the benefits differ from those who incur the costs, because the winners could compensate the losers making everyone better off. In that sense, such policies were deemed “potential pareto opima”—that is, policies that raise economic welfare and are thus desirable.⁹ Oxford economist I.M.D. Little (1950), however, argued that there was a fundamental flaw in the cost-benefit calculus. If the winners did not actually compensate the losers, then the desirability of the policy depends on interpersonal comparison of utility—i.e., an assessment that one person’s gain adds more to society than another person’s loss subtracts. Such a comparison is inherently subjective and cannot be justified on objective grounds. Moreover, in some (possibly many) cases,

⁹ Other issues arise that can change this calculus. For example, a policy that is admissible on cost-benefit grounds might not be desirable if it precludes another policy with an even larger net social benefit.

compensation may be very costly or even impossible because of the high cost of assigning gains and losses to individuals as well as costs from the compensation mechanism itself.¹⁰

Little's critique undermines the ethical underpinning of a number of pro-growth policies. For example, almost all economists favor free trade because it makes society much richer, but there is no guarantee that everyone is better off with unimpeded commerce. Indeed, in the public mind, free trade is associated with a great deal of dislocation and, for that reason, free trade policies often face considerable political opposition. In the case of trade, explicit policies are aimed at partially compensating those who lose jobs because of trade, but those policies have been criticized as poorly targeted and as incurring large economic costs because they can delay individuals' adaptation to circumstances altered by trade.

An advantage of the rising-tide tax system is that it would build in a kind of compensation mechanism for pro-growth policies. If the economy grows, people at every income stratum would be guaranteed of sharing in the gains, even if the pre-tax gains are highly concentrated. The rising-tide system would not prevent individual dislocations—for example, a job loss that would move someone down the income distribution—but it would prevent policies from causing a secular shift in the distribution of (after-tax) income.

With the rising-tide tax system in place, the ethical justification for pro-growth policies would be stronger (although not absolute because there could still be individual winners and losers). Perhaps more important, the new tax system would strengthen the

¹⁰ For example, if the compensation is done in the form of tax and transfer policy, both may distort economic incentives and also involve administrative and compliance costs.

stake of individuals at all income levels in pro-growth policies. That is, it would attenuate the class divisions in support for particular policies, increasing the odds that pro-growth policies could succeed politically.

The Advantage of Framing

An underlying motivation of the proposal to index tax rates to a measure of inequality is that it should be easier to get an electorate to agree to making taxes more progressive in response to increased inequality if they were asked to decide to do this *in advance*, before the increase in inequality actually transpires, by deciding on a *rule* for doing this, and so as to *frame* the tax system as a tool against inequality. Substantial research, from psychology, economics, and political science, supports this.

First of all, psychological research has confirmed that people are more principled, idealistic and altruistic about decisions that do not require immediate action. The experiments with human subjects by psychologists Liberman and Trope (1998) and their colleagues confirm this.

Underlying their experiments is a “temporal construal theory” which proposes, in the authors’ words, that “construals of distant future events are likely to be more abstract and consist of features that are central to the meaning of the event, whereas the construal of near future events is likely to be more concrete and include more peripheral and incidental features.” (Liberman and Trope, 1998, p. 8) Judgments about risk management, as well as about altruistic principles, are based on abstract deliberations and so they are more likely to be made about future events. In contrast, these judgments tend to get brushed aside in decisions about immediate events, because of the salience of other concerns.

Eyal *et al.* (2005) tested the temporal construal theory with a number of experiments. For example, in one experiment, they asked their student subjects to respond to the following question:

“Try to think of yourself next week (in a week a year from now) deliberating on the following dilemma: On the one hand, you are considering working extra hours in order to improve your chances for promotion. On the other hand, you could help a friend who asked for your help (for example, help him/her with school work, with family issues, with the job.” (p. 9)

The subjects were assigned to two treatment groups, one read the question about next week, the other read the question about a week a year from now. They found that the subjects who were asked about a year from now were significantly more likely to choose to help the friend. The subjects were also asked to fill out the Schwartz (1992) values questionnaire, which scored them on their achievement values versus their universalism values. It was found that the differences across individuals in values (abstract considerations closer to the real meaning of the choice) had a bigger effect on the differences across individuals in decisions made for a year from now than in decisions made for next week. Thus, in accordance with temporal construal theory, individual abstract values emerge more strongly in influencing decisions about the distant future than about the near future.

Secondly, another dimension of the proposed inequality indexation is the reframing of concepts that it entails. Political psychologists have demonstrated experimentally that exposure to a framing of thought about core values affects the frequency of thoughts that are consistent with the values and the political decisions that are made. Brewer and Gross (2005)] conducted an experiment about the school voucher controversy in which each participant was randomly assigned to one of four conditions

that differed only in value framing. Two frames of school vouchers were considered: an equality frame, that assumes school vouchers promote equality of opportunity, and an inequality frame, that assumes vouchers undermine equality. The participants were then read versions of an article extracted from real newspaper articles about school vouchers, but in one of four different forms (conditions) altered in terms of framing. The four conditions were no frame, first frame, second frame, and both frames. Subjects were then asked to write comments about the school voucher proposal, and their comments were assessed for reference to an equality frame. Only five percent of those who were not given either frame used equality language in their responses, contrasted with 23 percent of those receiving pro-voucher equality frames, 24 percent of those using anti-voucher equality frames, and 41 percent of those using both.

Thirdly, there are human impulses that resemble concern with inequality but do not always take that form, unless there is a framing that melds the two. Lerner and Simmons (1966), in a highly influential article, argued that people have a need to believe in a “just world,” to reassure themselves about their own safety, but that this belief does not always have the effect of impelling them to promote equality as a value. It has emerged through a number of experiments that, when subjects observe others’ suffering, there is an initial empathic emotional involvement with the victim, but as time progresses, and if there are no immediate means to help the victim, the subjects tend to denigrate the victim and invent shortcomings in the victim that are thought to have brought on the suffering. Belief in a just world is an essential human impulse, but may not lead to sustained efforts to combat injustice unless there is some institution that frames these efforts as part of a just world.

Another psychological literature concerns aspirations and social comparisons. The social psychologist Leon Festinger described an innate human comparison drive: the urge to compare oneself with others and continually rate one's own performance against others. Festinger argued (1954) that this drive is present in all societies and cultures, though the measures of success that are compared vary widely: comparisons are highly subject to framing changes. This innate impulse works against the emotions of empathy that promote egalitarian thinking, and is a fundamental obstacle to dealing with the problem of economic inequality, but implies that framing changes can make a fundamental difference.

Benjamin Friedman, in his book *The Moral Consequences of Economic Growth* (2005) argued that many of the social comparisons that people make are actually not with other people today but with their memories of the past. People compare themselves with their parents or others they knew from their parents' generation, and with themselves in the past. Friedman argued that when growth stalls, the comparisons become unfavorable, and the resulting malaise can have deleterious effects; notably, social intolerance can grow.

For Friedman, the conclusion was that economic growth should be pursued along a steady, sustained rate. But, another conclusion also follows from his own line of argument, namely that elements of society should also see their incomes grow steadily, and not suffer reversals. Congress's current *ad hoc* system of judgmentally adjusting income tax brackets from time to time means that any government response to sharply worsening inequality would necessarily involve moving people whose incomes had suddenly jumped up back down on the socioeconomic ladder, bringing on the unpleasant

comparisons. A system of indexation of the tax system to inequality would assure that responses to changing inequality would be made smoothly, and so that no one would have to see after-tax income taken away so as to make for unpleasant comparisons.

Another psychological literature concerns a human tendency towards vengeance. If an action is perceived as coming from hostile behavior of others, then the reaction may be strong and visceral. Matthew Rabin (1993) has effected a small revolution in game theory by postulating that the axioms of the theory should include that people are willing to sacrifice their own well being to punish those who are being unkind to them. Any after-the-fact measures to redress sudden increases in income inequality may tend to be viewed as the result of self-interested hostile behavior of others, while, in contrast, a set of abstract rules that were made before the outcomes in terms of inequality were known could not be so interpreted.

Advantage of Indexing over Wage Supports

The rising-tide tax system is likely to be much more effective than alternative policy options to provide income supports, such as higher minimum wages or so-called “living wage” proposals. Those proposals, instead of providing a direct subsidy to low-income people, mandates employers to pay at least a minimum wage level, and could actually be counterproductive if they reduced employment among low-skilled workers. They also could not stop a major deterioration of income inequality. The rising-tide proposal could also be more effective than specific proposals to alter the tax system, such as raising the earned income tax credit, because the adjustments would not be *ad hoc*. By

putting in place a passive tax structure that will automatically make whatever changes in taxes are necessary to achieve a Lorenz curve target, the changes are guaranteed.

Concerns

Redistribution is costly, and the costs may be asymmetric

The argument for the rising-tide system might be overwhelming if redistribution were costless and the policy were guaranteed sustainable. Neither condition is likely to be met in practice, which means that the argument for system must rest on weighing its advantages and disadvantages. First, redistribution is itself costly. Gruber and Saez (2000), after reviewing the literature on the responsiveness of taxable income to marginal tax rates concluded that the elasticity of taxable income is likely to range from 0.18 to 0.57, with the highest elasticities applying at the highest income levels. An elasticity of 0.3, for example, means that a 1 percent increase in tax rates would result in about a 0.3 percent reduction in taxable income.

The economic costs of taxation are highly uncertain. Some researchers suggest that the marginal excess burden of the income tax – that is, the efficiency cost over and above the amount of revenue collected – is as much as a dollar or more for every dollar raised. (Browning 1987) Other estimates put the costs far lower. Slemrod (1990) points out that the costs depend in part on the nature of the economic response. Timing responses—shifting income from one year to another to reduce one's tax bill are fairly easy, involve little cost, and are likely to be most sensitive to tax rates. Real responses – such as working harder or saving more – are likely to be least responsive and carry the greatest social cost.

How would the rising-tide system affect the excess burdens of taxation? If the future income distribution is unpredictable—that is, as likely to improve as to deteriorate—then indexing for inequality might reduce aggregate excess burdens. While top marginal rates would have to increase if the income tax distribution worsens, the converse would hold if the distribution improves. Moreover, whatever happens to the distribution of income, every dollar taxed at a higher rate will be matched by another dollar taxed at a lower rate. Since the proposal would not increase or decrease aggregate tax revenues, just change who pays. Thus, the expected effect of the indexing scheme on excess burdens from tax rates is zero. (And the gains from reducing risk and facilitating pro-growth policies remains positive.)

If the pre-tax distribution of income is expected to worsen over time, then the increased redistribution may reduce social welfare. (Even this depends on the proposition that the welfare costs from increasing higher marginal tax rates are greater than the welfare gains from reducing lower marginal rates.) And, if the indexing scheme turns out to be asymmetric, say due to political factors, then higher tax rates are more likely to increase than fall, which would be expected to entail efficiency costs.

Political Sustainability

A key question is whether symmetric indexing is politically sustainable. It is key for several reasons. First, the economic benefits of the rising-tide system depend in large measure on symmetry. If the tax system may only be indexed in one direction, e.g., in favor of a more equal distribution of income, then it would tend to reduce expected after-tax income for people at the top of the income distribution, would not reduce the variability of after-tax income by as much as symmetric indexing (that is, would be a far

less effective insurance mechanism), and would tend to increase top marginal tax rates, thus increasing the deadweight loss of the income tax. Moreover, many taxpayers would not perceive it as fair *ex ante* and so it would be a far less effective framing mechanism.

The political pressures for asymmetric indexing could be strong under certain circumstances. For example, during a recession in which total income fell but the share of income earned by those with low incomes increased (as in the great depression), symmetric indexing would call for cutting top rates and increasing rates (or reducing credits) for people with lower incomes. Advocates for low-income people would be tempted to argue that this would be adding insult to injury—those least able to manage the difficulties of a recession would see their taxes increase (or subsidies fall) while those most able would receive a tax cut. Such a redistribution could also tend to deepen a recession since the tax increases on lower-income people would tend to reduce aggregate consumption by much more than the offsetting tax cuts on high-income people would increase consumption.¹¹

This problem could be mitigated by committing to a countercyclical tax policy—that is, running deficits during recessions and surpluses (or smaller deficits) during economic expansions. The stimulative policy during the recession could be explicitly designed to guarantee that no one paid higher taxes or received smaller credits because of the automatic indexing. Tax increases could be deferred until aggregate income had risen for a specified number of quarters and then phased in. If the pre-tax income distribution reversed its course during the expansion, any deferred tax increases would be reduced or eliminated.

¹¹ High-income people save a much larger share of their income than low-income people, who spend virtually all of their income.

It is also important to recognize that, in some sense, the risk of asymmetric indexing *ex post* is symmetric itself. As we show below, a growth in inequality similar to that experienced over the past quarter century could lead to very high, and possibly unsustainable top tax rates. If top tax rates approached the levels that most economists believe would stifle economic growth, indexation would likely be adjusted or even reversed. As a result, it is likely that the limits to indexation apply in both directions.

A related issue is that it is impossible, barring a constitutional amendment, to prevent politicians from fiddling with the tax code, and it is unlikely that this plan would terminate their tendency to micromanage. However, it is possible that it would limit the dimensions by which they would manipulate the code. For example, after the Economic Relief Tax Act of 1981 indexed various income tax parameters for inflation, it was still possible that legislators could have undone the effect. But, despite numerous tax changes, the rate brackets, exemptions, etc. have remained subject to annual indexation. One might expect a similar response to the inequality indexation scheme, especially if it commanded widespread support and people perceived it as inherently fair. As long as political tinkering is not aimed at undoing the indexation scheme, its effect should not diminish the advantages of this proposal.

Difficulty of contemporaneous adjustment (and risk of adding uncertainty)

One of the practical problems with indexing for inequality is that the income distribution will not be known until after the end of the tax year. Currently, there is about a two year lag between the end of a filing season and the release of preliminary income tax statistics by the IRS. Thus, it is infeasible to adjust current year income tax rates, brackets, and

credits to adjust for current changes in the income distribution. It would, however, be possible to adjust after the end of the tax year.

One option would be to include an inequality insurance premium in individuals' base tax liability—say one percent of taxable income. When the IRS has compiled statistics on the actual after-tax income distribution, it could issue rebates (insurance payouts).¹² Those rebates could be mailed to taxpayers or deposited into an account specified by the taxpayer. Taxpayers might be encouraged to specify that all or a portion of their payout be deposited into a Roth IRA.¹³ These contributions might be allowed without regard to income or contribution limits that otherwise apply. This could provide another incentive for higher-income people to support the rising-tide system, and might also prove an effective way to induce lower-income people to save, since it would be relatively painless.

Another issue is whether the distribution should be adjusted based only on current year income, or based on a moving average. The argument for using a moving average is that it could reduce the size of average adjustments. A single anomalous year would have a smaller effect on tax liabilities, and it would reduce the effect of cyclical factors on tax

¹² The IRS could probably make a rough estimate of the income distribution shortly after annual income tax returns were filed, based on unaudited income tax returns. There would be errors due to inadvertent mistakes (not caught in the course of regular math-error processing) and fraud on tax returns, transcription errors for returns filed on paper, and missing data because of late-filed returns, but the IRS could presumably make adjustments for these factors based on historical experience. Alternatively, the tax authorities could wait for two years to make the rebates when better data are available.

¹³ Roth IRA's are retirement savings accounts for which contributions are made out of after-tax income. That is, contributions are not tax deductible, but earnings accrue tax free and as long as withdrawals are made after age 59 ½, they are tax-free as well. In traditional IRAs, contributions are deductible, but withdrawals are taxable. The administrative advantage of the Roth IRA contribution is that it does not change tax liability in the year in which the contribution is made.

burdens. However, smoothing would also diminish the insurance value of the proposal. The process would adjust only for secular changes in the income distribution.¹⁴

Setting the Right Baseline

There is no reason to think that the current distribution of after-tax income is ideal. Indeed, the distribution has been becoming less equal over time, both because of economic forces and explicit policy decisions, such as the 2001-2004 tax cuts. What's more, as noted, a majority of the public believes that the rich are not paying their fair share.

If the target distribution differs from the current distribution, indexing could be designed to close a fraction of the gap between the current law distribution of after-tax income and the targeted distribution. The larger the fraction, the sooner the target would be reached, but the more disruptive the tax changes would be. The smaller the fraction, the longer would be the transition.

Implementation

How it Would Work (Theory)

We describe here a system with endogenous tax rates that are adjusted automatically so as either to peg a level of inequality or at least to slow its worsening. We measure inequality by the Lorenz Curve, which is a plot showing, on the vertical axis, the percent of total income earned by all individuals up to a certain percentile of income against, on the horizontal axis, the percentile. For example, the Lorenz curve using data

¹⁴ If averaging is employed, the adjustments would have to be phased in over the moving average period.

from the U.S. Congressional Budget Office (CBO) shows that the bottom 20 percent of Americans earned only 6.8 percent of after-tax income in 1979, while the bottom 40 percent earned only 19.1 percent of after-tax income in 1979. (See Figure 1.) Changes in the Lorenz curve are indicators of changes in inequality; a downward shift in the curve indicates worsening inequality. The Lorenz curve, with the CBO data on after-tax income, shifted downward between 1979 and 2002: in 2002 the bottom 20 percent of Americans in earned only 5.1 percent of after-tax income, and the bottom 40 percent earned only 15.5 percent.¹⁵

If the Lorenz curve continues to shift downward at the same rate that it did between 1979 and 2002, then by 2025 the bottom 20 percent of Americans will be receiving only 3.4 percent of all after-tax income, while the bottom 40 percent will be earning only 11.9 percent.

The proposal here, an extension of a proposal made by Shiller (2003), is to index the tax rates in such a way that the Lorenz curve is systematically stabilized in future years, arresting or at least slowing its decline. With 100 percent indexing, tax legislation would direct the tax authorities to find a set of tax rates and tax brackets that would peg the Lorenz curve for after-tax income forever at a specified level, perhaps the actual level at the time of the legislation, halting its downward shift. With partial indexing, say $\frac{1}{4}$ indexation, the legislation would direct the tax authorities to find a set of tax rates and tax brackets that would reduce the movement in the Lorenz curve by the specified factor (here $\frac{1}{4}$) from what it would be under existing legislation. Partial inequality indexation

¹⁵ The distribution of before- and after-tax income eroded steadily between 1979 and 1999, although it reversed course between 1999 and 2002. That was because the stock market bubble of the late 1990s temporarily inflated incomes of people at the top of the income distribution (and was reversed when the bubble burst in 2000).

can also take the form of protecting only the left side of the Lorenz curve, protecting lower income people from further degradation while allowing inequality to worsen at higher income levels.

Whether inequality indexation is full or partial, it would be a concrete step towards arresting the deterioration in the income distribution, a step that can be taken in advance, before the deterioration occurs.

One way of imagining how this tax system could work, abstracting from real world details of our tax system, was described in Shiller (2003). Imagine that the tax collector has a spreadsheet containing the pre-tax income of every tax-paying unit (say, household), arranged these into a column of numbers and then sorted the rows of the spreadsheet from lowest to highest, lowest incomes on top, highest on bottom. The tax authority would construct a program on this spreadsheet that calculates a tax on each individual that would cause the after-tax incomes of all individuals to fall on a target Lorenz curve without changing the ordering of anyone's income.

To do this, the tax authority would create a new column on the spreadsheet that is the after-tax national income allocated across all individuals according to the target Lorenz curve. Then, each person's tax is the difference between actual income and the allocated after-tax income, and the tax rates can be inferred from the tax paid under this system. It is as simple as that. Note that the tax authority did not impose any structure to the tax system; there were no pre-specified tax rates or brackets. All the structure came from the target Lorenz curve. Any implied tax rates or brackets that emerge from this system are fully endogenous, and would change every time the tax authority calculates them. There would be no preconceived notion what is a fair or reasonable or plausible tax

rate or bracket, these would always be nothing more than the product of the calculation based on the target Lorenz curve. Thus, we can expect that outcomes with inequality targeting might be very different from outcomes of the usual tax legislative process.

The ranking of everyone by income would be the same, both before and after tax. The average tax rates could be negative for low income people, but never above 100 percent for anyone, so that there would be no egregious violations of incentive compatibility, though in principle the marginal rates could become high for high income people.

Of course, the notion of the tax authority calculating everything on a gigantic spreadsheet is too much of an idealization. There is too much complexity already in the tax code that is hard to change. In the next section, therefore, we drop this idealized spreadsheet story and examine a parsimonious set of changes to the existing tax code that could be used to stabilize some measure of the after-tax Lorenz curve.

A Practical Method of Implementing Inequality Indexing

Here we develop a method of implementing the rising-tide tax system while making relatively few adjustments to the present tax system. In the next section, we examine how inequality indexing might play out based on historical experience.

We want to start from the existing tax system, leaving as many of its features intact, and find a method that the Internal Revenue Service could use if so instructed to implement the rising-tide tax system. We need a program to do this, and we need sources of data that the program will use to derive changes in the tax system that achieve inequality indexation.

The method uses the Tax Policy Center (TPC) microsimulation tax model to calculate the tax rates that best match the target distribution of income assuming that taxable income does not change with the tax rate—that is, the initial simulations are static. To find the tax rates under each scenario, the method uses a Gaussian nonlinear optimization algorithm to minimize the sum of squared differences between the target after-tax income shares and the actual shares calculated by the TPC model given the set of income tax rates for the various tax brackets and a demogrant (that is, a refundable credit available to all households measured in dollars). The rate bracket thresholds are assumed to be exogenous for each filing status at the baseline income levels.

The method is to use the model to calculate income and payroll tax liability for a sample of individual income tax returns in the current year (for our simulations, 2002), augmented with data from the Current Population Survey to reflect nonfiling households.¹⁶ The sample is a stratified random sample of tax returns produced by the Statistics of Income (SOI) division of the Internal Revenue Service. The SOI database includes a set of sampling weights that can be used to estimate population totals based on the sample. To speed simulations, we use only a random one-in-five subsample of our matched SOI-CPS dataset. After subsampling, our sample includes 19,976 returns. For the simulations, we exclude dependent tax returns.¹⁷

Since the CBO target taxes include not only income and payroll taxes, but also corporate income taxes (assumed to be borne by recipients of capital income) and excise

¹⁶ See Rohaly, Carasso, and Saleem (2005) for a description of the TPC microsimulation tax model and underlying databases.

¹⁷ Ideally, we would like to be able to include dependents' income on their parents' returns, but there is no way to do that with information available on the public use file.

taxes, we add imputed values of those taxes to income and payroll taxes to calculate total tax liability for the household. When we simulate the effect of endogenous behavioral responses below, we assume that only individual income taxes are affected by individual income tax rates.¹⁸

There are a number of issues that need to be addressed in designing the indexing rule. (1) What is the target income distribution? Our assumption for purposes of the exercise with full indexation is that the target is the distribution at a particular date (either 1979 or 1994).

(2) How should the target be defined? For the simulations, we construct a measure of pre-tax income that is closely analogous to CBO's comprehensive household income—an expanded measure of income that starts with adjusted gross income and adds in certain income items excluded from AGI such as cash and in-kind transfers, and certain fringe benefits.

Alternatively, a broader measure of income could be used. For example, the Treasury Department for many years used a measure of income called “economic income,” which included unrealized capital income (including the imputed rental value of owner-occupied housing). (Cronin 1999) This is arguably a better measure of economic status, but has proven extremely controversial (especially the imputed rent component).

Some would argue that consumption would be a better measure of economic status. The distribution of consumption is much less skewed than the distribution of

¹⁸ In fact, corporate income taxes and payroll taxes might both be affected by changes in individual income tax rates. When the individual income tax rate is much higher than the corporate income tax rate, there is an incentive to convert individual income into corporate income. For example, sole proprietors might choose to incorporate. To the extent that high income tax rates discourage people from working, that would also reduce payroll tax receipts. In our simulations, we ignore such behavioral responses.

income (Burman, Gravelle, and Rohaly, 2006), but it cannot be measured accurately based on data reported on income tax returns.

Since our target is after-tax income, we then subtract federal taxes from our income measure. The federal taxes we include are the individual and corporate income tax, payroll taxes for Social Security and Medicare, and excise taxes.

(3) How should income be adjusted for family size? The Congressional Budget Office argues that income needs grow approximately with the square root of family size. (CBO 2001) Thus, we assign people to quintiles based on income divided by square root of family size. We base the target distributions on the distributions of after-tax income adjusted for family size estimated by the Congressional Budget Office (2005).

Various other issues arise in the calculations to compute the necessary tax changes and measure their effects. First, taxable income is very different from economic status. Thus, there is not a one-to-one correspondence between tax rates and after-tax income. For example, raising the top tax rate will affect people in all income categories (although mostly people in the top). This means that finding the set of tax rates that matches changes in the distribution of income is not straightforward. Our minimization algorithm allows us to match as closely as possible the target distribution of after-tax income.

Second, two particular complexities in the current tax system make it harder to retarget the after-tax income distribution: the individual alternative minimum tax (AMT) and the preferential tax rates that apply to capital gains and dividends.¹⁹ Both of these

¹⁹ While top tax rates on ordinary income, such as wages and salaries, can range as high as 35 percent, the top rate on long-term capital gains and most dividends is 15 percent. Legislation enacted in 2003 cut the capital gains tax rate from 20 percent to 15 percent and applied the same low rate to “qualifying dividends.” Under the law, the lower rates expire at the end of 2010, at which time the capital gains rate will return to

are effectively alternative tax systems overlaid onto the regular income tax—one a minimum tax and the other a maximum tax on certain forms of income. While it would be possible to retain these alternative tax systems under the rising-tide tax system, the relationship between the tax rates under the ordinary income tax and those that apply to capital gains, dividends, and the broader definition of income under the AMT would have to be specified.²⁰ Instead, for purposes of the simulations, we eliminate these complexities—i.e., repeal the AMT and tax capital gains and dividends the same as ordinary income—and recalibrate income tax rates so that the distribution of tax burdens in the base year—2002—is the same as under actual law.

Third, we have to decide how the demogrant is defined. We assume that the demogrant varies with the square root of family size. Thus, if the base demogrant is \$1,000 for a single person, it is \$1,414 for a couple and \$2,000 for a family of four.

Constrained Solutions

Because there is not a one-to-one correspondence between taxable income and economic status, there are likely an infinity of tax schedules that could mimic the distribution of income taxes.²¹ Thus, for our base simulations, we constrain the tax rate schedule to be a non-decreasing function of taxable income. That is, each marginal tax

20 percent and dividends will be taxed as ordinary income. (The President has proposed to make permanent the lower tax rates as well as most other provisions enacted in 2001 and 2003.)

²⁰ Prior to 1987, the preference for long-term capital gains was effected by means of a partial exclusion: only 40 percent of such gains were included in taxable income. This had the effect of taxing gains at 40 percent of the rate that applied to ordinary income. A similar approach might be used if policymakers wished to retain a preference for capital gains and dividends under the rising-tide system. (Note that this would also be significantly simpler for taxpayers to comply with than the alternative rate structure now in place.)

²¹ Simulations conducted in Stata suggest that this is true. When the solution is unconstrained, there are numerous very different tax vectors that produce very similar distributions of income taxes.

bracket has to be at least as high as the next lower one. This is consistent with the shape of the statutory rate schedule for as far back as we can remember.²²

Endogenous Income

Probably the single greatest drawback to income redistribution is that high marginal tax rates can discourage working and saving, and encourage unproductive tax avoidance and evasion—all of which serve as a drag on the economy. Not all tax avoidance responses carry large consequences for the economy, however. Slemrod (1990) argues that there are three levels of response to taxation—real, financial, and timing—arranged roughly in order from least responsive to most. Real responses include things like working and saving less and changing production decisions (e.g., the level or allocation of investment, production technology, and choice of goods and services to produce). These responses involve the greatest economic costs, but are also least responsive to taxation.

Then there are financial responses—basically engineering financial arrangements to minimize taxes. The main economic loss here arises from the expenses of designing and implementing the tax shelter arrangement. Taxpayers will engage in such financial engineering until the costs of the arrangements equal the benefits in terms of saved taxes.

Finally, there are timing responses, which involve relatively low cost and thus are easiest to accomplish. Burman, Clausing, and O’Hare (1994), for example, found a huge response of capital gains at the end of 1986 to the increase in rates enacted in August, 1986, but not effective until 1987. The response basically involved accelerating

²² Implicit tax rates do not, however, always follow a monotonic path. For example, the phase-out of the benefit of the 15-percent tax bracket in effect from 1988 to 1990 created a phantom 33-percent tax bracket for taxpayers with incomes in the phase-out range (known as “the bubble”). Currently, the phase-out of the AMT exemption has a similar effect on AMT taxpayers.

realizations of gains on assets that would have otherwise been sold within a few years of 1986. Timing is highly sensitive to tax rates, but involves little economic cost.

To the extent that the inequality indexation implicit in the rising-tide system involves more frequent changes in marginal tax rates, it might produce timing responses, especially if the rate changes can be anticipated in advance. But, if changes in marginal tax rates are made each year as inequality indexation would require, the changes will be more gradual than is usually the case today, and timing responses are likely to be modest.

Of greater concern is that higher marginal tax rates could produce much more real and financial responses designed to shelter income from tax. As noted earlier, if the elasticity of taxable income with respect to tax rates is constant, then since redistribution does not affect the overall amount of tax to be collected, the higher tax rates applied to some income would be exactly offset by the effect of lower rates applied to other income. It is, however, likely that the elasticity is an increasing function of the tax rate—i.e., that at a rate of 5 percent, there is little incentive to avoid tax; at a rate of 35 percent, there is a larger incentive. What's more, low- and middle-income taxpayers whose income primarily comes from wages, interest, and mutual funds, have little potential for tax evasion or avoidance since that income is reported to the IRS on information returns and it is difficult if not impossible to convert such income into lower-taxed or untaxed forms.

To illustrate the effect of tax avoidance and evasion under the indexing scheme, we apply a simple model of taxable income determination. We assume that taxable income is determined by a simple semi-log model:

(1)

Where TI_i is taxable income for household i , t_i is the marginal tax rate for household i , K_i is a constant that reflects differences in preferences, wealth, and ability to earn income for individual i , and a is a parameter assumed to be constant across the population. In the semi-log model, the elasticity of taxable income with respect to the tax rate is simply at —that is, it grows with the tax rate.

For our simulations with behavioral response, we choose $a = 4/3$, which implies that the elasticity is 0.4 at a tax rate of 30 percent. The revenue maximizing tax rate is 75 percent, at which point the elasticity is 1.0. Further increases in the tax rate would be counterproductive in the sense that tax revenue would decrease. The elasticity of 0.4 is broadly consistent with the findings of Gruber and Saez (2005) and CBO (2005), although our calibration of the elasticity to apply at a rate of 30 percent is somewhat arbitrary.²³

Under the assumption of zero income elasticity of taxable income, a straightforward simulation methodology may be derived consistent with equation (1). For each tax unit, K is chosen so that TI equals actual baseline income (TI^0) when the marginal tax rate is set at the baseline level (t_0). That is,

(2)

To simulate changes in tax rates, the computer searches for a tax rate that is consistent with endogenous taxable income. Figure 2 shows the solution process for the two most common cases. In Figure 2a, the equilibrium tax rate (for a married couple filing jointly in 2002) is 25 percent, which corresponds to a desired taxable income of

²³ In Gruber and Saez (2005), the elasticity increases in absolute value with income, but does not vary with the marginal tax rate. For the sample they examined, this might be an appropriate approximation, but if tax rates increased as much as simulated below, there would almost surely be a more elastic response.

about \$90,000. Since the 25 percent bracket spans from \$46,700 to \$112,850 in the example, the desired income is consistent with the tax rate so this is an equilibrium. In Figure 2b, there is no desired income consistent with a single tax bracket. At a tax rate of 25 percent, the taxpayer desires to earn more income than \$112,850, the top of the tax bracket, but at a tax rate of 35 percent, the taxpayer desires taxable income less than \$112,850. The solution in this case is for the taxpayer to earn exactly \$112,850—that is, just up to the income at which the couple would be pushed into the higher tax bracket.

A third possible case (Figure 1c) arises when tax rates decline with income. In that case, there may be multiple equilibria. Since we generally constrain rate schedules to be non-decreasing in income, this is not usually a problem. When it occurs, we choose the equilibrium closest to the initial taxable income.

To simplify the simulations, we assume that changes to taxable income do not change any other item on the income tax return.²⁴

Results

Static

Our first step is to estimate a set of tax rates under the modified law (excluding the AMT and taxing capital gains and dividends as ordinary income) that generates a

²⁴ This is a significant simplification relative to current law. Technically, we are assuming that the income changes affect taxable income, but not necessarily adjusted gross income (AGI). Changes to itemized deductions (for example, if the taxpayer decides to give more or less to charity) or below-the-line deductions such as IRA contributions would be in this category, but a change in wages and salaries, interest, or dividends would not. We assume that AGI does not change under the simulations because, when AGI changes, other things like itemized deductions, personal exemptions, AMT exemption, taxable portion of Social Security, IRA deductions, and a host of credits can also change because of various AGI-related phase-ins and phase-outs. The result is that the effective marginal tax rate can vary significantly from statutory rates, which would vastly complicate modeling the behavioral response. The assumption would also be approximately valid if taxpayers responded to their statutory rate, rather than their marginal effective tax rate. (There would still be a problem that, if the actual behavioral response affected AGI, we would be mismeasuring tax liabilities for affected taxpayers—probably by about 1 percent of income.)

distribution of after-tax income that matches the one under actual law for 2002 (See Table 1). For this baseline simulation, we not only constrain the tax rates to be non-decreasing in taxable income but also restrict the demogrant to equal zero. Since the AMT was a relatively minor aspect of the tax code in 2002, it is the treatment of capital gains as ordinary income that has the most impact on our modified rate structure. Since the vast majority of capital gains are reported by individuals in the top tax bracket, removing the preferential treatment for capital gains means that the top rate must fall from 38.6 percent to 34.7 percent to preserve the distribution of after-tax income observed under current law. Other rates do not differ greatly from their current-law values.

The next step is to estimate what the tax rate structure would be like in 2002 if we implemented our indexation proposal with the target distribution of after-tax income chosen to be that which prevailed in one of two specific past years, 1994 and 1979. We chose 1979 since it is the earliest year for which the CBO data on the distribution of after-tax income are available. We chose 1994 because it provides a distribution that is more similar to the one that existed in 2002 given that it is before the huge run-up in the stock market that occurred in the late 1990s. For both of the two years, we examine what the tax system would look like under degrees of indexation ranging from full indexation – eliminating all differences between the 2002 distribution and that of the given year – to 1/16th indexation, in which tax rates are altered to eliminate 1/16th of the difference in the income distribution.²⁵

²⁵ Suppose that the share of after-tax income for a given quintile of the population were to rise from 10 percent to 11.6 percent (a 16 percent increase). Under full indexation, we would alter tax rates so that the quintile's share remains at its original 10 percent. Under 1/16th indexation, we would alter tax rates so that

Table 1 presents our results assuming no microeconomic behavioral response to the required changes in tax rates. Going from the 2002 distribution of after-tax income to the 1979 distribution requires large increases in the top tax rate – from 34.7 percent to 77 percent in the case of full indexation. This is not surprising given that returning to the 1979 distribution requires the share of after-tax income going to the top one percent of the population to fall by more than 50 percent, from 11.4 percent to 7.5 percent. The substantial demogrant, \$2,452, is necessary to raise the share of after-tax income going to the bottom quintile; virtually no tax units in that income range are affected by changes in statutory rates since they do not actually pay a positive amount of individual income tax. This in turn means that the bottom two tax rates must be raised – to 18.4 percent – in order to offset the effects of the large demogrant on individuals in the second and middle quintiles of the income distribution whose after-tax incomes do not need to rise proportionately as much as those in the bottom quintile.

As expected, for lesser degrees of indexation, the general pattern remains the same, but the required changes in tax rates are smaller. But the sheer magnitude of the difference in the 1979 and 2002 distributions of after-tax income can be seen by the fact that even under 1/16th indexation, the top rate would need to rise by almost 20 percent, from 34.7 to 41.6 percent, two percentage points higher than the top rate before the 2001 tax cuts were implemented.

If we target the 1994 distribution of after-tax income – since it is more similar to the 2002 distribution – the required changes in tax rates are also smaller. Under full indexation, the top three rates would rise to between 42.3 and 54 percent, still

the quintile's share rises by only 15/16ths of that original change or 15 percent, resulting in a share of after-tax income of 11.5 percent.

substantially higher than rates in place for the last two decades. Since the share of after-tax income going to the bottom quintile did not fall nearly as much between 1994 and 2002 as it did between 1979 and 2002, the required demogrant is significantly smaller here, only \$414. Partly because of the demogrant's small size, and partly because the second and middle quintiles saw their share of after-tax income change by roughly the same proportion as the bottom quintile, the lowest tax rate actually falls in this case, to 5.6 percent from 9.8 percent, as opposed to the increase observed when indexing to the 1979 distribution.

With Behavioral Response

Given the magnitude of the changes in statutory rates required to match the distributions of both 1994 and 1979 – particularly in the top brackets – allowing for a behavioral response of tax rates on effort to earn income could have a potentially large impact on our simulation results.

For our simulations with endogenous taxable income, we again constrain tax rates to be non-decreasing in taxable income and allow for a demogrant that increases with the square root of the number of members of the tax unit.

Table 2 presents our results for the simulations allowing for behavioral response. Targeting the 1994 distribution of after-tax income requires very large increases in each of the top four tax rates; all are greater than 60 percent. One interesting result is that for the case of full indexation, the required bottom tax rate is negative—that is, there is a subsidy on taxable income in that bracket.²⁶

²⁶ This is similar to the phase-in portion of the EITC and the refundable portion of the child tax credit, both of which imply negative tax rates on wages for low-income families. Allowing a negative tax rate on all

The tax rates required to return the distribution of after-tax income to the one that existed in 1979 are even higher. Under full indexation, the top four tax rates would need to rise to 69.5 percent, essentially the revenue-maximizing tax rate.

Tables 3 through 7 summarize how well we can hit the targets in the various cases, as well as give further information about the tax brackets that will do so. Usually, the match is quite close, but not always. For example, Table 7 shows that, assuming a behavioral response, the optimization algorithm was unable to come up with a set of tax rates that brought the share of after-tax income for the top one percent of earners down close to its share in 1979. Despite very high tax rates, the share of after-tax income going to the top one percent exceeds its 1979 value by more than one-third.

Tables 8 through 10 report a similar exercise but where the optimization criterion is relaxed to preserve the Lorenz curve by quintiles only (that is, dropping the deviation of the target for the top 90 percent, top 95 and top 90 percent from the loss function for the minimization). We did this variation on our theme because of the difficulty just noted in hitting the target for the top one percent when there was a behavioral response. Presumably, the distribution of incomes within the top 20 percent is less central to our concerns about income inequality, and so the calculations in these tables ask less of the inequality indexation. We see then that we were able to hit the targets in all cases, even the 1979 target case with behavioral effects, though, once again, the top tax bracket is very high.

income could engender some counter-intuitive tax-minimizing behavior such as not taking deductions to which a tax filer might be entitled. We did not model such behavior.

What is the Optimal Degree of Indexing?

For both economic and political reasons, the optimal degree of indexing may be less than one hundred percent. First, the historical simulations suggest that continuing growth in inequality could lead to very high top tax rates and commensurately high economic costs. The optimal degree of indexing would balance those economic costs against the economic benefits from indexation. The optimal degree of indexation depends in a complicated way on the positive effects from risk reduction and increased economic growth and the negative economic incentive effects from potentially higher tax rates. Although we have not worked out the optimal degree of indexation in an explicit model, it is reasonable to assume that it might not be equal to 100 percent.²⁷

There may also be political reasons for less than full indexation. Complete indexation implies that low-income people will forever be limited to their currently paltry share of the distribution of after-tax income. As noted, this might not be politically sustainable if the pre-tax income distribution improves. An optimist might also conclude that it isn't desirable even *ex ante*. Partial indexation would allow low-income people to gain a larger share of the after-tax distribution of income (in exchange for the risk that they could continue to lose ground if the pre-tax distribution of income continued to deteriorate).

Conclusions and Recommendations

²⁷ There are analogies to other forms of insurance, such as health insurance. Absent any behavioral response, most risk-averse consumers would choose full insurance for unpredictable health expenses if they could purchase it on an actuarially fair basis. However, insurance induces moral hazard (excessive spending on medical care), which raises the cost of insurance and makes less than full insurance optimal.

We have presented a case for adopting inequality indexation in our tax system, and argued that doing so could improve the prospects for growth-enhancing economic policies. The rising tide that lifts all boats might then become a reality rather than a political slogan.

We have developed a method, based on a simulation model of the tax system and of the behavioral responses to tax rates, that could be adapted to implement a practical indexation scheme. Although we don't underestimate the practical barriers that would stand in the way of full scale implementation, our simulations suggest that a real-world rising-tide tax system would be feasible.

We did find, however, that there were some difficulties, when behavioral responses were included in the analysis, in fixing the 1979 income distributions in 2002, 23 years later, a time period over which there were sharp increases in inequality. This suggests that, going forward, it may be hard (or even undesirable) to achieve 100 percent inequality indexation if future changes in the pre-tax income distribution follow past patterns.

One implication of our simulations is that it would be best if inequality indexation were enacted in tandem with tax reform. There would be two advantages of this approach. First, aligning the definition of taxable income more closely with economic well-being would simplify the indexation process and make it more effective, since people identified as low-income for tax purposes would be more likely to actually have low economic incomes. Second, a broader income measure would allow any income distribution target to be achieved with lower income tax rates (holding revenue constant).

This means that any behavioral responses would be attenuated, lower any economic costs from future indexation.

We do not, however, believe that comprehensive tax reform is necessary for inequality indexation to be feasible or desirable. We showed that a version of the rising-tide tax system would be feasible with only minimal changes to the current tax system. In practice, all that would be required would be to convert any desired tax preference for long-term capital gains and dividends into an exclusion (rather than alternative rates) and to either eliminate the AMT or peg its rates to a fixed relationship to individual income tax rates.

In addition to the degree of indexation and definition of the tax base, policymakers would have to address several other issues. One would be what the target level of the income distribution should be. An obvious candidate would be the current-law distribution—as that would constitute pure insurance—but some may believe that a more equal distribution should be the goal. Particularly if a more equal distribution is the goal, it may make sense to phase in the changes slowly so as to minimize disruptions. As noted, it probably makes sense to set targets in terms of a moving average of income (to smooth out year to year fluctuations) and to implement the indexation in terms of an insurance premium to be settled when the actual distribution becomes known.

There is also a question about the extent to which income distribution targets should be set—that is, do we care about changes in income inequality within the top quintile. Not targeting the top percentiles for inequality indexation makes it easier to hit the target Lorenz curve, and leaving them out of the system would not seem to imperil public support for pro-growth policies.

Some may be concerned that the proposal would represent a radical change in the US tax system, but the risks are relatively modest. Any tax law, including this one, can be changed by Congress. In our view, the risks lie more in the direction of the costs of delaying the introduction of the proposal.

Other policies to combat income inequality, such as government sponsorship of education and opportunity, should of course be continued. To the extent that such policies are successful in reducing pre-tax income inequality, the need for income tax progressivity as a means of achieving after-tax income targets lessens and the indexation scheme would automatically reflect that. Even if such policies cannot prevent worsening inequality, they might reduce the disturbing trend and reduce the size of indexing adjustments under the rising-tide system.

References

- Alesina, Alberto, and Dani Rodrik, "Distribution, Political Conflict and Economic Growth: A Simple Theory and Some Empirical Evidence," in A. Cukierman, Z. Hercovitz and L. Leiderman (eds.), *The Political Economy of Business Cycles and Growth*. M.I.T. Press: Cambridge, MA, 1992.
- Autor, David H., Frank Levy and Richard J. Murnane, "The Skill Content of Recent Technological Change: An Empirical Investigation," *Quarterly Journal of Economics*, 118:1279-1333, November 2003.
- Autor, David H., Lawrence F. Katz and Melissa Kearney, "Trends in US Wage Inequality: Re-Assessing the Revisionists" NBER Working Paper No. 11627, September 2005.
- Bartels, Larry M. 2003. "Homer Gets a Tax Cut: Inequality and Public Policy in the American Mind." Presented at the Annual Meeting of the American Political Science Association, Philadelphia, August 2003.
- Brewer, Paul R., and Kimberly Gross, "Values, Framing, and Citizens' Thoughts about Policy Issues: Effects on Content and Quantity," *Political Psychology*, 26(6):929-48, 2005.
- Brownlee, W. Elliot. 2000. "Historical Perspective on U.S. Tax Policy Toward the Rich," in *Does Atlas Shrug*, Joel Slemrod ed.
- Burman, Leonard E., Kimberly A. Clausing and John O'Hare. 1994. "Tax Reform and Realizations of Capital Gains in 1986" *National Tax Journal*, 47(1):1-18.
- Burman, Leonard E., Jane G. Gravelle, and Jeffrey Rohaly. 2006. "Toward a Consistent Measure of Income Distribution," *NTA-TIA Proceedings of 99th Annual Conference on Taxation*.
- Congressional Budget Office. 2005. "Historical Effective Federal Tax Rates: 1979 to 2003." Available at <http://www.cbo.gov/ftpdocs/70xx/doc7000/12-29-FedTaxRates.pdf>.
- Dew-Becker, Ian, and Robert J. Gordon, "Where Did the Productivity Growth Go? Inflation Dynamics and the Distribution of Income," *Brookings Papers on Economic Activity*, 2005-II.
- Ehrenreich, Barbara, *Nickel and Dimed: On (Not) Getting By in America*, New York: Metropolitan Books, 2001.
- Eyal, Tal, Nira Liberman, Michael Sagristano and Yaacov Trope, "Resolving Value Conflicts in Planning the Future," unpublished paper, Tel Aviv University, 2005.

Fehr, Ernst, and Klaus M. Schmidt, "A Theory of Fairness, Competition and Cooperation," *Quarterly Journal of Economics* 817-868, August 1999.

Festinger, Leon, "A Theory of Social Comparison Processes," *Human Relations*, 7:117-40, 1954.

Forbes, Kristin, "A Reassessment of the Relationship between Inequality and Growth," *American Economic Review*, 90:869-87, September 2000.

Frank, Robert H. 2000. "Progressive Taxation and the Incentive Problem," in *Does Atlas Shrug*, Joel Slemrod ed.

Friedman, Benjamin M. *The Moral Consequences of Economic Growth*, New York: Knopf, 2005.

Goldin, Claudia, and Robert A. Margo, "The Great Compression: The Wage Structure in the United States at Mid-Century," *Quarterly Journal of Economics* 107:1-34, 1992.

Gruber, Jon, and Emmanuel Saez, "The Elasticity of Taxable Income: Evidence and Implications," National Bureau of Economic Research Working Paper No. 7512, January 2000.

Gyourko, Joseph and Joseph Tracy, "Using Home Maintenance and Repairs to Smooth Variable Earnings," Staff Report, Federal Reserve Bank of New York No. 168, May 2003.

Hacker, Jacob, "Privatizing Risk without Privatizing the Welfare State: The Hidden Politics of Social Policy Retrenchment in the United States," *American Political Science Review*, 98(2):243-60, 2004.

Harsanyi, John, "Cardinal Utility in Welfare Economics and the Theory of Risk Taking," *Journal of Political Economy*, 61:434-5, 1953.

Heathcote, Jonathan, Kjetil Storesletten and Giovanni L. Violante, "The Macroeconomic Implications of Rising Wage Inequality in the United States," unpublished paper, Georgetown University and CEPR, 2004.

Iacoviello, Matteo, "Household Debt and Income Inequality, 1963-2003," unpublished paper, Boston College, 2005.

Kniesner, Thomas J., and James P. Ziliak. 2002. "Tax Reform and Automatic Stabilization," *American Economic Review*, 92(3):590-612.

Ladd, Everett Carll and Karlyn Bowman. 1998. *Attitudes Toward Economic Inequality*. AEI Press.

Lerner, Melvin J., and C. H. Simmons, "Observer's Reaction to the 'Innocent victim,'" *Journal of Personality and Social Psychology*, 15:57-62, 1966.

Levy, Frank, and Richard J. Murnane, *The New Division of Labor: How Computers Are Creating the Next Job Market*, Princeton: Princeton University Press, 2005.

Liberman, Nira, and Yaacov Trope, "The role of feasibility and Desirability Considerations in Near and Distant Future Decisions: A Test of Temporal Construal Theory," *Journal of Personality and Social Psychology*, 75:5-18, 1998.

Little, I. M. D., *A Critique of Pure Welfare Economics*, 1954.

Moss, David A., *When All Else Fails: Government as the Ultimate Risk Manager*, Cambridge MA: Harvard University Press, 2004.

Penner, Rudolph G. 2004. "Searching for a Just Tax System." *Urban-Brookings Tax Policy Center: Discussion Paper No. 13*.

Persson, Torsten and Guido Tabellini, "Is Inequality Harmful for Growth?" *American Economic Review*, 84(3):600-621, June 1994.

Rabin, Matthew, "Incorporating Fairness into Game Theory and Economics," *American Economic Review*, 83:1282-1302, 1993.

Rawls, John, *Theory of Justice*, Cambridge: Harvard University Press, 1971.

Rohaly, Jeffrey, Adam Carasso, and Mohammed Adeel Saleem. 2005. "The Urban-Brookings Tax Policy Center Microsimulation Model: Documentation and Methodology for Version 0304." Available at:
http://www.urban.org/UploadedPDF/411136_documentation.pdf.

Schwartz, S. H. "Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries," in M. P. Zanna, Editor, *Advances in Experimental and Social Psychology*, Vol. 25, pp. 1-65, New York: Academic Press, 1992.

Shiller, Robert J., *The New Financial Order: Risk in the 21st Century*, Princeton: Princeton University Press, 2003.

Slemrod, Joel, "Optimal Taxation and Optimal Tax Systems," *Journal of Economic Perspectives*, Winter 1990, 157-178.

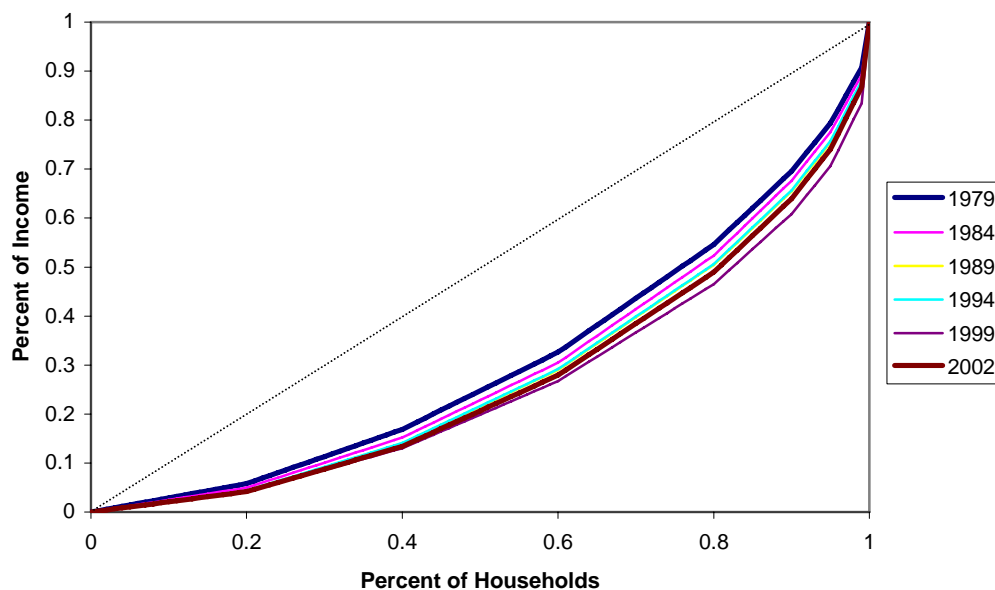
Slemrod, Joel. 2003. "The Role of Misconceptions in Support for Regressive Tax Reform." *Urban-Brookings Tax Policy Center*.

Sullivan, Teresa A., Elizabeth Warren and Jay Westbrook, *The Fragile Middle Class: Americans in Debt*, New Haven: Yale University Press, 2001.

Thurow, Lester. 1970. "Analyzing the American Income Distribution." *American Economic Review* Vol. 60:2.

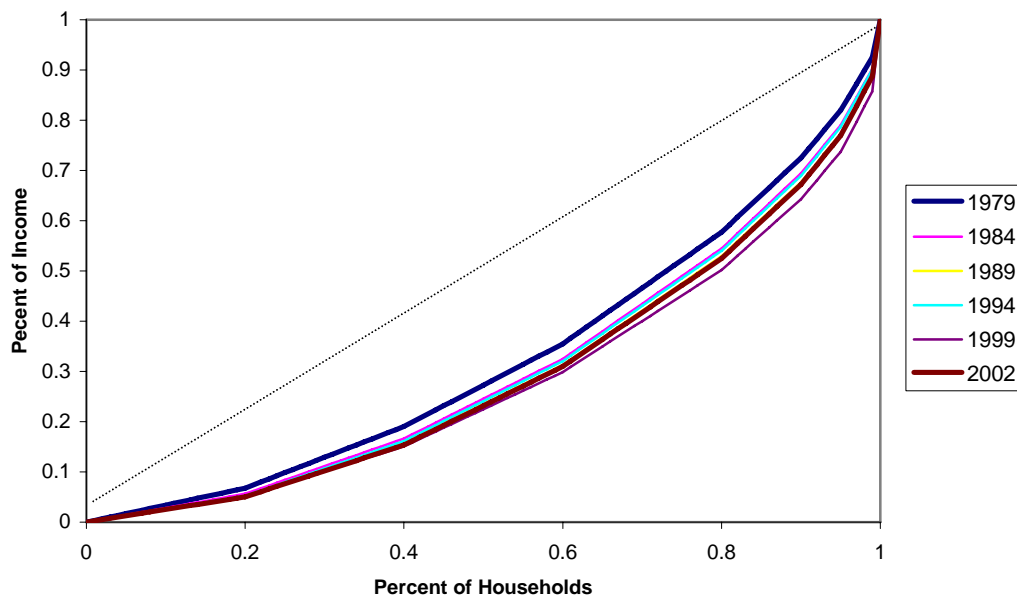
Thurow, Lester. 1971. "The Income Distribution as a Pure Public Good." *Quarterly Journal of Economics* Vol. 85:2.

Figure 1a. Pre-Tax Lorenz Curves, 1979-2002
(Selected Years)



Source: Congressional Budget Office (2005) and authors' calculations.

Figure 1b. Post-Tax Lorenz Curves, 1979-2002
(Selected Years)



Source: Congressional Budget Office (2005) and authors' calculations.

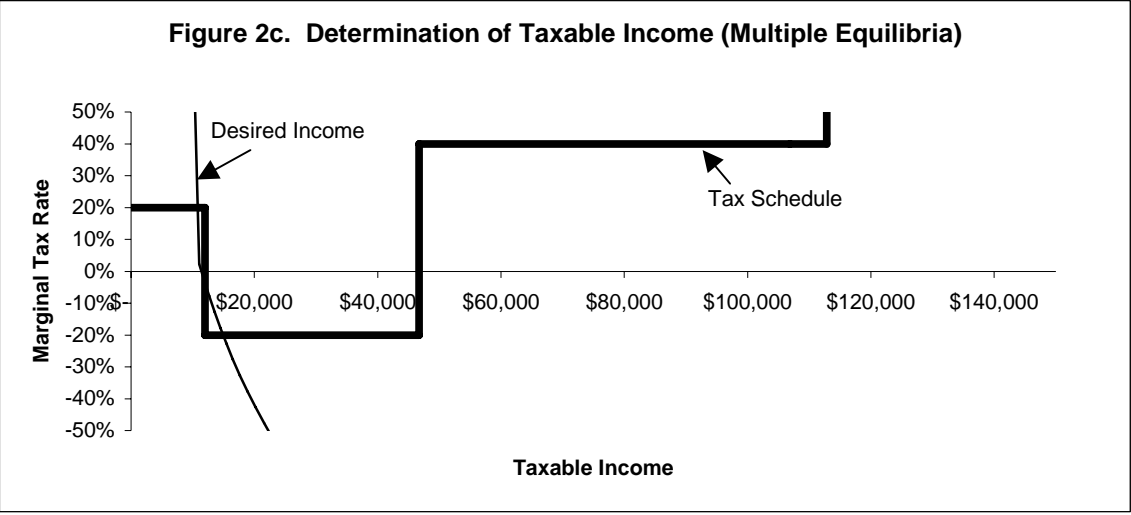


Table 1. Individual Income Tax Rates Required to Match Prior-Year Distributions of After-Tax Income

Target Distribution of After-Tax Income	Required Tax Rates In Modified Individual Income Tax System ¹					Demogrant (Dollars) ²	
2002 Current Law Baseline	10	15	27	30	35	38.6	0
Imposing Non-Decreasing Tax Rates							
2002 Current Law ³	9.8	15.1	26.9	31.1	34.7	34.7	0
1994 Current Law							
Full Indexation	5.6	14.6	26.4	42.3	42.3	54.0	414
1/2 Indexation	7.6	14.9	26.7	37.0	37.0	46.6	204
1/4 Indexation	8.8	15.0	26.8	34.4	34.4	42.9	101
1/8 Indexation	11.1	12.9	28.9	28.9	37.1	40.4	58
1/16 Indexation	9.7	15.0	26.9	32.4	32.4	40.1	24
1979 Current Law							
Full Indexation	18.4	18.4	27.7	65.3	65.3	77.0	2,452
1/2 Indexation	14.7	16.5	27.4	48.5	48.5	58.2	1,231
1/4 Indexation	12.5	15.7	27.2	40.1	40.1	48.7	617
1/8 Indexation	11.3	15.3	27.1	35.9	35.9	44.0	309
1/16 Indexation	10.7	15.2	27.0	33.8	33.8	41.6	154
No Restriction on Tax Rates							
2002 Current Law ³	10.0	15.0	27.3	21.1	53.6	31.2	0
1994 Current Law	4.3	15.6	23.4	115.4	-65.3	73.2	406
1979 Current Law	17.8	19.1	25.1	130.8	-40.4	96.3	2,449
No Negative Rate Except Bottom Rate							
2002 Current Law ³	10.0	15.0	27.3	20.9	54.1	31.1	0
1994 Current Law	5.1	14.9	25.5	64.8	0.0	62.0	411
1979 Current Law	18.2	18.7	26.4	100.0	0.0	89.3	2,452
Rates No Less Than 90% of Previous Rate							
2002 Current Law ³	9.9	15.1	27.0	29.4	37.9	34.1	0
1994 Current Law	5.5	14.6	26.4	43.8	39.4	54.6	414
1979 Current Law	19.9	17.9	28.0	67.4	60.7	77.9	2,472

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Notes:

(1) Modified individual income tax system is 2002 current law with the following changes: the individual alternative minimum tax (AMT) is repealed; long-term capital gains are taxed at the same rate as ordinary income.

(2) Demogrant is multiplied by the square root of the number of members of the tax unit. Thus a tax unit with four members receives twice the demogrant shown. The demogrant is constrained to be non-negative.

(3) The demogrant is constrained to equal 0 in this case.

Table 2. Individual Income Tax Rates Required to Match Prior-Year Distributions of After-Tax Income Allowing For Behavioral Response¹

Target Distribution of After-Tax Income	Required Tax Rates In Modified Individual Income Tax System ²						Demogrant (Dollars) ³
2002 Current Law Baseline	10	15	27	30	35	38.6	0
Imposing Non-Decreasing Tax Rates							
1994 Current Law							
Full Indexation	-8.7	27.0	62.2	64.8	64.8	64.8	118
1/2 Indexation	5.8	17.8	40.0	56.5	56.5	56.5	193
1/16 Indexation	9.7	15.1	28.0	33.4	38.5	38.5	25
1979 Current Law							
Full Indexation	0.0	55.2	69.5	69.5	69.5	69.5	2,137
1/2 Indexation	1.7	33.3	65.6	65.6	65.6	65.6	1,083
1/16 Indexation	10.6	15.7	29.8	40.6	40.6	40.6	154
Imposing Non-Negative Tax Rates Except Bottom Rate							
1979 Current Law							
Full Indexation	9.4	75.0	75.0	75.0	75.0	50.3	2,235
1/2 Indexation	-0.9	36.6	72.8	75.0	75.0	48.5	1,034
1/16 Indexation	10.4	15.9	30.5	55.8	42.6	32.8	153

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Notes:

(1) Taxable income is assumed to change based on the percentage difference between the tax unit's marginal tax rate under current law and under the indexation proposal. The elasticity of taxable income with respect to the marginal tax rate is assumed to be proportional to the tax rate and equals 0.4 at a rate of 30 percent.

(2) Modified individual income tax system is 2002 current law with the following changes: the individual alternative minimum tax (AMT) is repealed; long-term capital gains are taxed at the same rate as ordinary income.

(3) Demogrant is multiplied by the square root of the number of members of the tax unit. Thus a tax unit with four members receives twice the demogrant shown. The demogrant is constrained to be non-negative.

Table 3. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm, 2002 Current Law

Income Percentile	After-Tax Income (\$ millions)								
	Target	Actual							
		Non-Decreasing Rates	Difference (Percent)	Unrestricted Rates	Difference (Percent)	Non-negative Rates	Difference (Percent)	Rates at least 90% of Previous Rates	Difference (Percent)
0-20	19,864.8	19,865.1	0.0	19,865.0	0.0	19,865.0	0.0	19,865.0	0.0
20-40	41,886.6	41,895.9	0.0	41,888.2	0.0	41,888.2	0.0	41,888.2	0.0
40-60	62,717.4	62,717.4	0.0	62,716.2	0.0	62,716.2	0.0	62,716.2	0.0
60-80	97,870.3	97,857.0	0.0	97,870.8	0.0	97,870.8	0.0	97,870.8	0.0
80-90	70,367.9	70,400.1	0.0	70,367.8	0.0	70,367.8	0.0	70,367.8	0.0
90-95	47,449.9	47,423.4	-0.1	47,449.9	0.0	47,449.9	0.0	47,449.9	0.0
95-99	62,677.1	62,679.2	0.0	62,677.1	0.0	62,677.1	0.0	62,677.1	0.0
99-100	65,501.7	65,501.5	0.0	65,501.7	0.0	65,501.7	0.0	65,501.7	0.0
All	466,862.7	468,339.6	0.3	468,336.7	0.3	468,336.7	0.3	468,336.7	0.3

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 4. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm, 1994

Income Percentile	After-Tax Income (\$ millions)														
	1994 Current Law Full Indexation									1994 Current Law 1/2 Indexation			1994 Current Law 1/4 Indexation		
	Actual									Actual			Actual		
	Target	Non-Decreasing Rates	Difference (Percent)	Unrestricted Rates	Difference (Percent)	Non-negative Rates	Difference (Percent)	Rates at least 90% of Previous	Difference (Percent)	Target	Non-Decreasing Rates	Difference (Percent)	Target	Non-Decreasing Rates	Difference (Percent)
0-20	20,684.1	21,198.7	2.5	21,172.6	2.4	21,189.8	2.4	21,198.2	2.5	20,272.0	20,521.2	1.2	20,066.4	20,189.2	0.6
20-40	44,392.9	43,458.8	-2.1	43,501.2	-2.0	43,472.4	-2.1	43,459.7	-2.1	43,135.8	42,673.5	-1.1	42,508.3	42,278.8	-0.5
40-60	64,039.4	64,660.2	1.0	64,673.7	1.0	64,665.1	1.0	64,660.4	1.0	63,374.8	63,691.7	0.5	63,043.0	63,202.2	0.3
60-80	100,351.1	100,209.5	-0.1	100,106.0	-0.2	100,176.7	-0.2	100,207.3	-0.1	99,114.6	99,040.6	-0.1	98,497.4	98,459.0	0.0
80-90	71,866.2	71,689.9	-0.2	71,928.6	0.1	71,764.0	-0.1	71,695.0	-0.2	71,137.9	71,051.4	-0.1	70,774.4	70,733.8	-0.1
90-95	47,832.8	48,017.7	0.4	47,828.3	0.0	47,962.9	0.3	48,014.0	0.4	47,631.0	47,722.6	0.2	47,530.2	47,574.0	0.1
95-99	61,502.1	61,492.4	0.0	61,502.1	0.0	61,492.0	0.0	61,492.3	0.0	62,133.4	62,128.6	0.0	62,448.5	62,446.2	0.0
99-100	56,194.4	56,194.5	0.0	56,194.4	0.0	56,194.5	0.0	56,194.5	0.0	60,063.1	60,063.2	0.0	61,994.5	61,994.5	0.0
All	466,862.7	466,921.7	0.0	466,906.9	0.0	464,075.8	-0.6	464,079.9	-0.6	466,862.7	466,892.8	0.0	466,862.7	466,877.7	0.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 5. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm With Behavioral Response, 1994

Income Percentile	After-Tax Income (\$ millions)								
	1994 Current Law Full Indexation			1994 Current Law 1/2 Indexation			1994 Current Law 1/16 Indexation		
	Target	Actual		Target	Actual		Target	Actual	
		Non- Decreasing Rates	Difference (Percent)		Non- Decreasing Rates	Difference (Percent)		Non- Decreasing Rates	Difference (Percent)
0-20	20,684.1	20,636.4	-0.2	20,272.0	20,487.9	1.1	19,912.2	19,945.5	0.2
20-40	44,392.9	44,013.9	-0.9	43,135.8	42,738.8	-0.9	42,038.1	41,981.3	-0.1
40-60	64,039.4	65,220.1	1.8	63,374.8	63,661.3	0.5	62,794.3	62,821.2	0.0
60-80	100,351.1	99,182.5	-1.2	99,114.6	98,964.4	-0.2	98,034.9	98,038.4	0.0
80-90	71,866.2	72,423.2	0.8	71,137.9	71,361.1	0.3	70,502.0	70,489.8	0.0
90-95	47,832.8	48,582.4	1.6	47,631.0	47,335.1	-0.6	47,454.7	47,453.8	0.0
95-99	61,502.1	60,842.6	-1.1	62,133.4	62,178.7	0.1	62,684.6	62,683.5	0.0
99-100	56,194.4	58,842.9	4.7	60,063.1	60,165.9	0.2	63,441.8	63,441.5	0.0
All	466,862.7	469,744.0	0.6	466,862.7	466,893.2	0.0	466,862.7	466,855.0	0.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 6. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm, 1979

Income Percentile	After-Tax Income (\$ millions)														
	1979 Current Law Full Indexation									1979 Current Law 1/2 Indexation			1979 Current Law 1/4 Indexation		
	Actual									Actual			Actual		
	Target	Non-Decreasing Rates	Difference (Percent)	Unrestricted Rates	Difference (Percent)	Non-negative Rates	Difference (Percent)	Rates at least 90% of Previous	Difference (Percent)	Target	Non-Decreasing Rates	Difference (Percent)	Target	Non-Decreasing Rates	Difference (Percent)
0-20	26,988.3	27,720.6	2.7	27,711.7	2.7	27,722.2	2.7	27,782.8	2.9	23,425.3	23,808.0	1.6	21,643.3	21,842.8	0.9
20-40	50,481.4	48,896.7	-3.1	48,931.3	-3.1	48,911.4	-3.1	48,858.5	-3.2	46,182.3	45,385.6	-1.7	44,032.1	43,632.5	-0.9
40-60	66,743.9	68,081.8	2.0	68,071.0	2.0	68,069.3	2.0	68,014.5	1.9	64,728.1	65,374.3	1.0	63,719.9	64,031.9	0.5
60-80	102,513.3	102,074.4	-0.4	101,991.0	-0.5	102,033.1	-0.5	102,107.5	-0.4	100,197.5	99,985.0	-0.2	99,039.3	98,935.2	-0.1
80-90	72,170.7	72,084.5	-0.1	72,303.5	0.2	72,202.6	0.0	72,109.1	-0.1	71,291.1	71,256.0	0.0	70,851.2	70,838.8	0.0
90-95	47,666.9	47,833.7	0.3	47,657.5	0.0	47,740.3	0.2	47,805.3	0.3	47,548.3	47,623.1	0.2	47,489.0	47,521.4	0.1
95-99	57,437.7	57,428.7	0.0	57,437.7	0.0	57,431.5	0.0	57,430.0	0.0	60,099.9	60,095.9	0.0	61,431.5	61,429.7	0.0
99-100	42,860.5	42,860.6	0.0	42,860.5	0.0	42,860.6	0.0	42,860.6	0.0	53,390.1	53,390.1	0.0	58,656.5	58,656.5	0.0
All	466,862.7	466,981.0	0.0	466,964.2	0.0	464,263.2	-0.6	464,261.8	-0.6	466,862.7	466,918.0	0.0	466,862.7	466,888.8	0.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 7. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm With Behavioral Response, 1979

Income Percentile	After-Tax Income (\$ millions)												
	1979 Current Law Full Indexation					1979 Current Law 1/2 Indexation					1979 Current Law 1/16 Indexation		
	Target	Actual				Target	Actual				Target	Actual	
		Non- Decreasing Rates	Difference (Percent)	Non-negative Rates	Difference (Percent)		Non- Decreasing Rates	Difference (Percent)	Non-negative Rates	Difference (Percent)			
0-20	26,988.3	26,730.3	-1.0	27,035.7	0.2	23,425.3	23,348.3	-0.3	23,229.1	-0.8	20,306.5	20,357.8	0.3
20-40	50,481.4	49,239.8	-2.5	49,015.5	-2.9	46,182.3	45,801.5	-0.8	45,872.2	-0.7	42,419.2	42,329.1	-0.2
40-60	66,743.9	70,489.2	5.6	70,730.8	6.0	64,728.1	66,343.3	2.5	66,617.0	2.9	62,963.6	63,015.3	0.1
60-80	102,513.3	101,260.2	-1.2	102,245.1	-0.3	100,197.5	98,648.8	-1.5	98,510.9	-1.7	98,170.4	98,160.2	0.0
80-90	72,170.7	69,090.6	-4.3	68,380.3	-5.3	71,291.1	71,293.2	0.0	70,966.9	-0.5	70,521.2	70,527.4	0.0
90-95	47,666.9	46,407.4	-2.6	44,659.8	-6.3	47,548.3	48,212.5	1.4	48,669.6	2.4	47,444.4	47,420.5	-0.1
95-99	57,437.7	58,902.8	2.6	56,907.7	-0.9	60,099.9	60,305.3	0.3	60,720.3	1.0	62,430.3	62,436.2	0.0
99-100	42,860.5	58,039.5	35.4	55,293.9	29.0	53,390.1	58,541.7	9.6	56,379.5	5.6	62,606.9	62,607.5	0.0
All	466,862.7	480,159.8	2.8	474,268.8	1.6	466,862.7	472,494.6	1.2	470,965.5	0.9	466,862.7	466,854.0	0.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 8. Individual Income Tax Rates Required to Match Prior-Year Distributions of After-Tax Income by Quintiles Only

Target Distribution of After-Tax Income	Required Tax Rates In Modified Individual Income Tax System ¹						Demogrant (Dollars) ²
2002 Current Law Baseline	10	15	27	30	35	38.6	0
Imposing Non-Decreasing Tax Rates							
1994 Current Law Full Indexation							
Without Behavioral Response	4.3	16.1	16.1	29.9	52.3	68.1	408
With Behavioral Response³	-9.4	27.3	47.4	50.6	50.6	50.6	102
1979 Current Law Full Indexation							
Without Behavioral Response	18.7	19.0	19.0	39.7	73.1	96.1	2,459
With Behavioral Response³	33.6	74.2	74.2	74.2	74.2	74.2	2,590

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Notes:

(1) Modified individual income tax system is 2002 current law with the following changes: the individual alternative minimum tax (AMT) is repealed; long-term capital gains are taxed at the same rate as ordinary income.

(2) Demogrant is multiplied by the square root of the number of members of the tax unit. Thus a tax unit with four members receives twice the demogrant shown. The demogrant is constrained to be non-negative.

(3) Taxable income is assumed to change based on the percentage difference between the tax unit's marginal tax rate under current law and under the indexation proposal. The elasticity of taxable income with respect to the marginal tax rate is assumed to be proportional to the tax rate and equals 0.4 at a rate of 30 percent.

Table 9. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm With Behavioral Response, 1979

Income Percentile	After-Tax Income (\$ millions)				
	1979 Current Law Full Indexation				
	Target	Actual			
		Without Behavioral Responses	Difference (Percent)	With Behavioral Responses	Difference (Percent)
0-20	26,988.3	27,742.3	2.8	28,617.8	6.0
20-40	50,481.4	48,897.8	-3.1	48,923.0	-3.1
40-60	66,743.9	67,989.1	1.9	67,144.5	0.6
60-80	102,513.3	102,136.4	-0.4	96,721.4	-5.6
80-100	220,135.8	220,135.8	0.0	221,467.1	0.6
All	466,862.7	466,901.4	0.0	462,873.8	-0.9

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)

Table 10. Comparison of After-Tax Income Targets and Actual Values After Optimization Algorithm With Behavioral Response, 1994

Income Percentile	After-Tax Income (\$ millions)				
	1979 Current Law Full Indexation				
	Target	Actual			
		Without Behavioral Responses	Difference (Percent)	With Behavioral Responses	Difference (Percent)
0-20	20,684.1	21,180.9	2.4	20,614.0	-0.3
20-40	44,392.9	43,505.8	-2.0	44,051.7	-0.8
40-60	64,039.4	64,613.6	0.9	65,266.2	1.9
60-80	100,351.1	100,180.7	-0.2	99,094.7	-1.3
80-100	237,395.2	237,395.2	0.0	237,892.2	0.2
All	466,862.7	466,876.2	0.0	466,918.8	0.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0305-3A)