

(Some) Inequality Is Good for You

Richard B. Freeman

Economists have a more favorable view of inequality than moral philosophers, theologians, other social scientists, and human beings in general. They do not have a more favorable view of inequality because economists are hard-hearted and care less about the poor than other people, though some economists fit that description. Nor do economists have a more favorable view on inequality because they—or more properly, we—are highly paid beneficiaries of inequality or consultants to corporate America, though again some of us fit those descriptions.

Economists look favorably on inequality because economic analysis stresses that inequality creates incentives that induce people to work hard, invest in skills, and choose work activities where the economy most needs

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labor. Unlike theologians, economists know why archeologists have found no relics from the Garden of Eden. It is because Adam and Eve had no incentive to produce anything in the Garden. They had no incentive since all consumption was freely available.

Most other members of our species see inequality differently. Many recognize that economic incentives motivate people, but associate inequality more with morally offensive differences in living standards than with incentives. Many regard inequality as arising largely from random luck—who happens to own the land where oil is located or where an earthquake strikes, who happens to have been born into a wealthy or poor family or to have received a particular genetic endowment—rather than as incentives to perform. Some psychologists worry that economic incentives weaken the intrinsic motivation to work and thus do less than economists believe they do to induce people to work. Some argue that monetary incentives have perverse effects on work by undermining intrinsic motivation.

Exhibit 1 documents these differences with a set of quotations from economists and non-economists. Economists defend inequality/incentives as virtuous because it motivates people to undertake the activities that society wants. Moreover, to the extent that it does that, inequality is in part self-correcting. If the pay for star professional wrestlers rises above that for sociologists, which leads to greater inequality, more young persons will train in the squared circle. This will increase the supply of wrestlers, lowering their pay and dampening the wage gap between wrestlers and sociologists. Non-economists object to inequality because they see that inequality is associated with some people living as paupers while others live as princes or princesses. When individuals are poor through no fault of their own, the resultant inequality has nothing to do with incentives and everything to do with morality.

How strong is the evidence regarding the incentive effects of inequality? Does an analysis that treats inequality solely as incentives imply that more inequality is invariably better for production than less inequality? Per the title of this essay, how much inequality is good for a society? And where does the United States fit on the inequality spectrum—too much inequality, or too little inequality, or just the right amount?

THE VIRTUES AND SINS OF INEQUALITY

Consider first the virtuous side of inequality as seen through the eyes of an economist. Imagine a world with no inequality of pay. Regardless of

EXHIBIT I

*Economists' versus others' views of inequality***A. Economists**

Inequality of wealth and incomes . . . forces all those engaged in production to the utmost exertion in the service of the consumers. It makes competition work . . . [Countries like the United States] enjoy the highest standard of living ever known in history because for several generations no attempts were made toward "equalization" and "redistribution." Inequality of wealth and incomes is the cause of the masses' well-being, not the cause of anybody's distress. —Ludwig von Mises

The inequality of reward which the market system engenders does not seem to me something which persons of good sense should worry about over-much . . . Let us . . . suppose that equality of reward all round is *decreed* to be the order of the day . . . We should expect a tendency to a decline in output per head. If the reward remains the same *whatever the degree of productivity*, we are surely warranted in supposing that there will be at least some diminution of production. —Lionel Robbins

Inequality is necessary for motivation and reward, which contribute to the organization of society for survival and progress . . . —Harry G. Johnson

It is not too much of an exaggeration to say that all of economics results from inequality . . . increasing dispersion can offer increased opportunities for specialization and increased opportunities to mesh skills and activities. —Finis Welch

B. Non-economists

It is the belief that extremes and excesses of inequality must be reduced so that each person is free to fully develop his or her full potential. This is why we take precious time out of our lives and give it to politics. —Paul Wellstone, U.S. political leader

We can either have democracy in this country or we can have great wealth concentrated in the hands of a few, but we can't have both. —Louis Brandeis, U.S. Supreme Court justice

I strongly believe in fighting inequality. —William J. Wilson, sociologist

(continued)

EXHIBIT 1 (continued)

Inequality makes everyone unhappy, the poor most of all, and that is well within the remit of the state. More money gives less extra happiness the richer we get, yet we are addicted to earning and spending more every year. —Polly Toynbee, journalist

However, as long as poverty, injustice and gross inequality persist in our world, none of us can truly rest . . . Massive poverty and obscene inequality are such terrible scourges of our times—times in which the world boasts breathtaking advances in science, technology, industry and wealth accumulation—that they have to rank alongside slavery and apartheid as social evils. —Nelson Mandela, speech to Trafalgar Square Crowd, February 3, 2005

(I)ncreasing income inequality is bad for the economy, bad for crime rates, bad for people's working lives, bad for infrastructural development, and bad for health—in both the short and long term. —*British Medical Journal*

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whether people work hard or take it easy, whether they work in sewers or palaces, do brain surgery or flip burgers, they are paid the same. Would many people work hard or choose the more onerous job and produce much in such a world? Economic analysis suggests that most people would not work hard. They would avoid unpleasant or demanding tasks and shun training for careers that require great knowledge or skill. The result would not be socialism at its idealistic best—from each according to their ability and to each according to their need—but a nonproductive economic mess, in which people would not give their full effort to work, and where the Soviet-era workers' aphorism about pay and effort would hold: "They pretend to pay us, and we pretend to work." Output would increase if the society paid more to those who would work harder or who would gain more skills or who would accept more onerous tasks—i.e., if the society accepted

greater inequality. In fact, economies that operate by the market rule “to each according to their ability and effort” outperform those that have relied on moral suasion or altruism to motivate productive effort, at least insofar as the performance of “existing socialism” speaks to the question.

Generalizing from this, economists see efforts to reduce inequality below what the market produces as costing society in terms of output. The efficiency-equity trade-off creates a choice between lower output and a more desirable distribution of income and higher output and a less desirable distribution.¹ If the gain in output from higher inequality is sizeable, the rate of poverty could be lower in a high inequality society than in a low inequality society. In fact, when China chose a more market-oriented economy over Communist central planning after the death of Mao Tse-tung, the rate of poverty fell sharply even though inequality rose at one of the fastest rates in recorded history. What matters is the steepness of the efficiency-equity trade-off and the link between poverty and inequality to economic growth. If inequality incentives induce great growth compared to the rise of inequality, poverty will fall as inequality rises. If inequality incentives induce modest growth compared to the rise of inequality, poverty will rise as inequality rises.

Turning to the vice of inequality as seen through the eyes of the non-economist or of economists with an egalitarian bent, consider a world in which most inequality results from random chance. Society hands large sums of money to some people and little to others for no particular reason. You were born a Rockefeller or not; a superstar entertainer or not. You bought the winning lottery ticket or you got the ticket worth nada. To the extent that inequality is due to luck unrelated to incentives, it is hard to justify, and costs society little to reduce. Indeed, one of the main precepts of public finance is that it is better to tax factors that are in inelastic supply than factors in elastic supply because taxing the former does not affect their supply of services. Henry George advocated the abolition of all taxes save those on land value because he believed that land was completely inelastic.² Some economists favor a head tax on similar grounds. This perspective makes the elasticity of supply responses to marginal incentives a critical factor in assessing government efforts to tax and redistribute income.

Psychologists who study motivation have a different objection to the economic case for inequality in economic rewards. Differentiating between the extrinsic and intrinsic incentives for undertaking actions, they argue that increases in extrinsic economic incentives adversely affect intrinsic

motivation and thus are to some extent self-defeating.³ Reward children for learning math and the children end up disliking math and shunning the subject later. Pay athletes huge sums for performing in the clutch and the pressure leads them to choke. Posing the issue in this way directs attention at the impact of extrinsic incentives on intrinsic incentives and on their net effect on economic behavior.

In sum, the critical issue in the debate over inequality is the extent to which it acts as an incentive and affects total production as opposed to the extent to which it reflects an uneven distribution of resources and consumption. Economists see incentives as being more important in behavior than do most other people and thus generally favor higher levels of inequality than most others. But economic analysis does not predict that increasing equality inevitably increases output nor that a society should only choose more unequal outcomes along the equity-efficiency frontier. Economics is more subtle in its predictions about the relation between inequality and output and more catholic in its assessment of social choice and preferences than is indicated by some of the statements of blanket support for inequality in Exhibit 1.

The Relation Between Inequality and Output

Economic analysis suggests that the relation between output and inequality follows an inverse-U shaped curve. At very low levels of inequality, increases in inequality generate greater social output. The equity-efficiency trade-off operates in that area: society gets more output with more inequality. It chooses the most desirable point. But the gains in output from inequality decline and then drop. Beyond the level of inequality that maximizes output, increases in inequality reduce output. Exhibit 2 illustrates this relation. The horizontal axis displays the level of inequality in an economy. The vertical axis shows output, defined as the sum of the production of each person in the economy based on the incentive determined by the level of inequality.⁴ When inequality is zero, output is zero: no incentive → no production. At the maximal level of inequality, where all of the output goes to a single person, output is higher than zero but low. As inequality increases from zero incentives, output increases. People have an incentive to work harder or take on more onerous and productive tasks. As rewards go increasingly to the more productive, some less able workers might reduce their effort but total output would rise as those with greater chances of gaining the larger

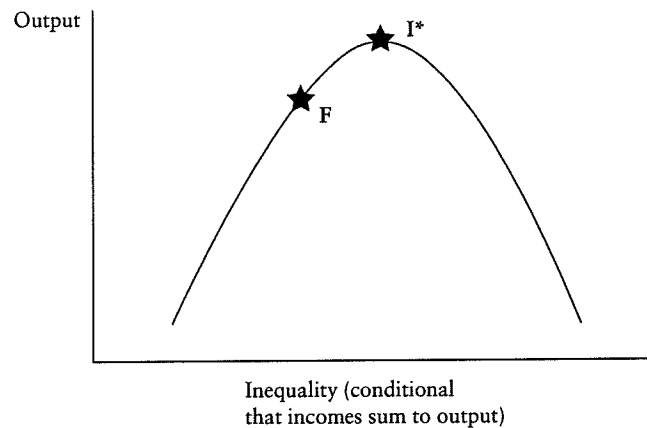


EXHIBIT 2 The inequality-output inverse U-curve

rewards produce more. Then the gains from inequality end and society reaches the output of I^* , which is the output-maximizing level of inequality.

To the right of I^* , output falls as inequality increases toward the maximum level. The higher inequality will induce a few “superstars” with a chance to reach the top of the income hierarchy to work harder and produce more, but it will demotivate everyone else. Since there are more normal workers than superstars, total output falls. At the extreme, where one person or entity earns nearly everything—the feudal lord, the slave owner, a small group of billionaires—and where most people earn subsistence wages, there is an incentive to become the dominant person or group but not to do much of anything. Run a golf tournament where there is a single prize, and Tiger Woods and a few other players will enter and try hard. But most players, with little or no chance of gaining the prize, will drop out of the tour. In fact, of course, golf and other tournaments give prize moneys to people who rank tenth, twentieth, fiftieth, and so forth (in declining amounts) so that all players have an incentive to enter the tournament and do their best.

A numerical example clarifies the economics. Say a firm has five workers, two of whom are very able and three of whom are less able. The firm has \$30 to motivate them to try hard. Under maximal inequality, it offers \$30 to the worker who produces the most and none to anyone else. The two workers with a chance of winning try hard. One produces say, 10 units of output beyond what they otherwise would do, and the other produces 9 units of output

beyond what they otherwise would do. The three other workers give up and produce the bare minimum. Total output is 19 units higher than it would have been if the firm had not spent \$30 on prizes for performance. Now change the prize structure so that there are four prizes: \$15 to the top person, \$8 to the second, \$4 to the third, and \$3 to the fourth person. Everyone has an incentive to try to do better. The top two people have less incentive than when there was a single large prize that they might win. Accordingly, they would give less effort and produce less, say 8 and 7 units above what they would have done without any prize. But all of the other workers have an incentive to try harder. Say they produce 5, 4, and 3 units more. Total output is 27 units higher with the new prize structure. The more egalitarian reward system led to 8 units greater output than the winner-take-all reward system.

To be sure, a numerical example can demonstrate only that something is possible. Assume more superstars capable of winning the tournament or a greater gap between the output of the more able and less able, and you can generate the result that rewarding those at the top of the distribution all of the prizes produces greater output than giving incentives for persons throughout the distribution. Contrarily, assume more regular workers, and the less unequal reward system would have looked better than it did in my example. Both economic theory and evidence suggests that the inverse-U shaped inequality-output curve is a realistic representation of economic reality.

What Economic Theory Says

The relevant theory is the theory of prizes in tournaments when competitors vary in their abilities.⁵ Like much economic theory, the analysis is fairly mathematical but structured around a comprehensible idea that can be explained without any math. The analysis specifies the conditions under which it is better to give incentives to many people (multiple prizes in a tournament)—lower inequality—than to concentrate incentives for the top person in the income distribution (single prize in a tournament)—high inequality. The technical condition for multiple prizes to induce greater output than single prizes is that each workers' marginal productivity declines with effort or, equivalently, that their cost of effort rises with the level of effort so that the highly productive squeeze out less additional output when they are given increasingly large incentives compared to the more numerous less productive.

The analysis depends greatly on the uncertainty of gaining greater rewards from increased effort. If there was no uncertainty, the top person

would always win, and once everyone knew who the top person was, the other highly productive persons would give up; and similarly for persons lower in the distribution. That uncertainty or luck is a positive contributor to production in a tournament model shows that, contrary to the general view that luck is a nonproductive factor in the distribution of income, some uncertainty/luck is in fact productivity-motivating *ex ante*. Tournaments are often structured to make sure that uncertainty or luck plays a role in who wins. Tournaments seek to enlist persons of roughly similar abilities so that everyone has some plausible chance of winning (Lazear and Rosen).⁶ In some cases, tournaments handicap competitions by giving the less able a leg up in the race, as is common in horse racing.

Finally, while analysis of behavior in tournament settings focuses on individual efforts, much production in the world occurs through the joint activity of persons cooperating together in some form of team production. Assembly line output depends on the inputs of all workers, but even in more individualistic activities, such as research and development, what one person does affects another person's productivity. And while golfers compete as individuals in tournaments, the entire product relies on the activity of many persons beyond the players: caddies, grounds personnel, the transportation sector that enables people to travel to watch the tournament, the producers of clubs and balls, and so forth. The fact that people cooperate in most real production activities suggests that the outcome maximizing level of inequality is lower than the outcome maximizing level of inequality in a tournament, where individuals engage solely in competitive activities and which generates no productivity spillovers or interactions. In short, economic analysis predicts that under reasonably general conditions, there is a level of inequality that is output-maximizing. This level depends on the distribution of abilities, uncertainty or luck, and team production, among other factors. The general proposition is more far-reaching than a numerical example, but it still is argumentation, not evidence. To demonstrate that the output is related to inequality in a U-shaped relation in the real world, we must examine the link between inequality and actual economic outcomes and behavior.

EVIDENCE

Analysts have investigated the relation between inequality and economic outcomes in two ways: through studies of aggregate data linking measures

of inequality and output generated across countries or states; and through experiments that manipulate incentives in laboratory or field conditions. Each has advantages and disadvantages. Studies that analyze the relation between inequality and productivity at the national or regional level cannot readily pin down the link because so many things differ among countries or regions. Experimental studies can pin down the inequality-behavior link but in potentially artificial settings or in situations that may not generalize beyond the specific experiment.

Aggregate Economic Relations

The aggregate studies yield one consistent empirical finding. In cross-section comparisons of countries, inequality is invariably lower among countries with higher levels of per capita GDP. The particular shape of this relation is less clear. There is a mixed bag of evidence on the famous Kuznets curve,⁷ which posits that inequality rises with GDP per capita from very low levels and then falls at higher levels of GDP per capita, which produces the inverse relation of GDP per capita with inequality that dominates most data sets. While it is always valuable to have established an empirical regularity in data, the fact that inequality is lower in countries with higher GDP per capita does not provide much insight into the incentive effect of inequality of interest to us. Analysts interpret the falling inequality with per capita income as largely reflecting the impact of the level of economic development on inequality rather than the impact of incentive inequality on output; and they are undoubtedly correct.

Aggregate studies with a better chance of identifying any causal relation from inequality to growth look at the relation between inequality in a given year and ensuing growth of GDP per capita. By measuring inequality before the period of growth, and focusing on changes in GDP, these analyses eliminate the base-level link from GDP per capita to inequality and any potential impact of fixed country/state factors on inequality and GDP per capita. As Exhibit 3 shows, studies that relate inequality to ensuing economic growth across countries and states generally find a negative relation. This suggests that the average economy is on the right side of the optimal inequality point so that lowering inequality increases output. But the pattern is complicated, and dependent on the data set. The most extensive data on inequality across countries is from Deininger and Squire. Taking all of their data, analysts obtain negative relations between inequality and growth. But analyses limited

EXHIBIT 3
Cross-country studies of the effect of inequality on growth

<i>Reference</i>	<i>Effect of inequality on growth</i>	<i>Source of inequality data</i>
REGRESSIONS WITH LEVEL OF INEQUALITY		
Venieris and Gupta (1986)	---	Fifty observations on fifty countries (one observation per country), between 1958 and 1971 (inclusive); equally balanced between developing and developed countries
Clarke (1992)	---	SOCIND, Jain (1975), U.N. (1981), U.N. (1985), Lecaillon et al. (1984); data lie between 1958 and 1976 (inclusive).
Persson and Tabellini (1992)	---	Paukert (1973), Taylor and Hudson (1972), Taylor and Jodice (1983)
Perotti (1994)	---	Flora, Kraus, and Pfenning (1987), Jain (1975), Kuznets (1963), LeCaillon et al. (1984), Paukert (1973), Pryor (1989), U.N. (1981), van Ginneken and Bak (1984), World Development Report (1979), World Development Report (1986)
Alesina and Rodrik (1994)	---	Fields (1973), Jain (1975)
Persson and Tabellini (1994)	---	Paukert (1973), Lindert and Williamson (1985), Hartog and Veenbergen (1978), U.S. Dept. of Commerce (1975), Jain (1975), Flora et al. (1987)
Benhabib and Spiegel (1994)	-	Paukert (1973), Lindert and Williamson (1985), Hartog and Veenbergen (1978), U.S. Dept. of Commerce (1975), Jain (1975), Flora et al. (1987)
Perotti (1996)	---	Data of Persson and Tabellini (1994)
Li and Zou (1998)	+++	The portion of Deininger and Squire high-quality data that contains inequality observations on two consecutive five-year periods
Deininger and Squire (1998)	--	Deininger and Squire high-quality
Sylwester (2000)	---	Deininger and Squire high-quality, Deininger and Squire low-quality
Easterly (2000)	---	Deininger and Squire high-quality, Deininger and Squire low-quality
Keefer and Knack (2000)	--	Deininger and Squire high-quality

(continued)

EXHIBIT 3 (continued)

<i>Reference</i>	<i>Effect of inequality on growth</i>	<i>Source of inequality data</i>
Barro (2000)	+++ in countries with per capita GDP > US \$2,000 --- in countries with per capita GDP < US \$2,000	Deiningering and Squire high-quality, plus extra observations mainly drawn from developing countries
Banerjee and Duflo (2000)	Growth inversely correlated with changes in inequality level	Data used by Forbes (2000)
Deiningering and Olinto (2000)	+++	Deiningering and Squire high-quality
Castello and Domenech (2001)	++	Deiningering and Squire high-quality
REGRESSIONS WITH CHANGES IN INEQUALITY		
Forbes (2000)	+++	The portion of Deiningering and Squire high-quality data that contains inequality observations on two consecutive five-year periods
Panizza (2002)	---	U.S. state data from IRS Statistics of Income

NOTE: +++, --- : significant sign; ++, -- : sometimes significant; +, - : generally not significant

to their “high quality” data (which eliminates many developing countries) often yield a positive relation between inequality and growth. Dividing the countries by GDP per capita, Deininger and Squire, and Barro also, find that advanced countries have growth either unrelated or positively related to inequality while developing countries have growth negatively related to inequality.⁸ There is also evidence from Sweden that in a country with very low inequality, higher levels can add to growth: in the 1980s and 1990s, growth was higher in Swedish counties with higher inequality.⁹

An alternative and arguably better way to identify the effect of inequality on growth rates is to compare changes in growth rates with changes in inequality. This design has the virtue of examining how changes in inequality affect growth rates in the same country or geographic unit rather than contrasting growth rates across areas with differing levels of inequality and possibly other unmeasured factors. Analyses using this difference in design yield contradictory results. Using the Deininger-Squire “high quality” data, Forbes found that increases in inequality raise growth rates while Banerjee and Duflo found that changes in inequality around an initial level reduce growth.¹⁰ But using state data from the United States (which is invariably of high quality on an international scale), Panizza found that increases in inequality reduced growth rates.¹¹

In short, the results from analyses of aggregate data are largely inconclusive. One reason is that there is significant measurement error in both the inequality data and growth data in aggregate cross-country analyses. Another reason is that, even well measured, the Gini coefficient of inequality for any country reflects much more than the incentive inequality of concern to us. Measured inequality (and changes in inequality) consists of incentive inequality and other factors—luck, random or unexpected shocks, shifts in industry or occupational composition, as well as measurement error—that are unrelated to incentives. Even if these problems could be resolved, there is no single growth equation to which an inequality measure can be simply added as another explanatory factor. Some growth equations focus on investment in human capital, others on research and development, others on institutional factors, any of which could interact with inequality in substantive ways. Given these problems and the inconclusive empirical results, I put little weight on this evidence and find more compelling evidence from experimental studies that vary incentives in controlled settings to see how high and low levels of inequality affect economic performance.

The Maze Tournament

To illuminate the incentive-output relation, Alex Gelber and I undertook a set of maze experiments at the Harvard Business School Computer Lab for Experimental Research in 2004–2005.¹² In each experiment, we gave six participants the task of solving packets of paper mazes in two rounds: a first round that would identify the participants' maze-solving ability and a second round in which we had subjects compete in a tournament with three incentive treatments, each of which distributed \$30 in total prizes.¹³ Our *no-inequality* treatment gave each participant \$5 regardless of their performance. The only incentive was the intrinsic desire to do well, either absolutely or relative to others. Our *high-inequality* treatment gave \$30 to the top scorer and nothing to anyone else. This is the most unequal possible distribution of \$30. The *no-inequality* and *high-inequality* treatments pin down the end points for the hypothesized curve relating output to inequality. In the *medium-inequality* condition, we gave out multiple prizes. There are many ways to do this. We chose a reward structure in which the winner received \$15, the second-prize winner received \$7, the third-prize winner received \$5, the fourth-prize winner received \$2, the fifth-prize winner received \$1, and the sixth-prize winner received nothing. This gave incentives to persons in all parts of the distribution of first-round maze performances.

Thus, we presented people with one of the following three incentive/inequality schemes (see Exhibit 4) in the tournament round of our experiment:

In the *high-inequality* treatment, the incentive is \$30 to finish first but there is no incentive to get the second, third, or worse score. In the *medium-inequality* treatment, there is an incentive to do better throughout the distribution, with the highest marginal incentive at the top of the tournament. In the *no-incentive* treatment, there is no incentive to do well, beyond intrinsic motivation.

We also varied the amount of information the subjects had about their relative standing in the distribution of maze-solving skills. At the end of

EXHIBIT 4
Position in tournament

<i>Incentive/inequality</i>	<i>1 (\$)</i>	<i>2 (\$)</i>	<i>3 (\$)</i>	<i>4 (\$)</i>	<i>5 (\$)</i>	<i>6 (\$)</i>
High	30	0	0	0	0	0
Medium	15	7	5	2	1	0
None	6	6	6	6	6	6

Round 1, in half of the groups we informed subjects of the scores of all group members in the first round. Since individuals knew their own score, this enabled them to place themselves in the distribution and assess their chances of ranking high or low in the second round. We refer to this treatment as “full information.” In the other half of the experiments, we said nothing about how others performed.

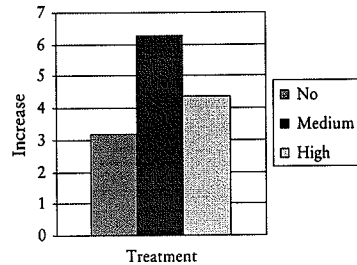
We presented the exercise to the subjects in paper and pencil form. We asked subjects to report the number of mazes they solved and told them that they had to solve them in the order they were presented in the packet. Serendipitously, this provided an independent test of the effect of incentives on behavior, since it gave subjects the potential to fudge or cheat in the experiment, consciously or unconsciously.

The upper part of Exhibit 5 gives the main results from our experiment in terms of the change in the number of mazes solved per person from the first round to the second round in the three inequality incentives in the full information and no information conditions. The changes per person use the first-round numbers of mazes solved as a control for the individual’s maze-solving ability. The results under full information show the inverted U relation. There is a modest increase in the number of mazes solved for the no-inequality group (due presumably to learning); a large increase in the number of mazes solved for the middle-inequality group; and a moderate increase in the number of mazes solved for the high-inequality group. The results under no information show only modestly different responses among the treatments: when subjects have no information about their relative position in the distribution of maze-solving, they have no clear incentive to try harder under the different inequality treatments.

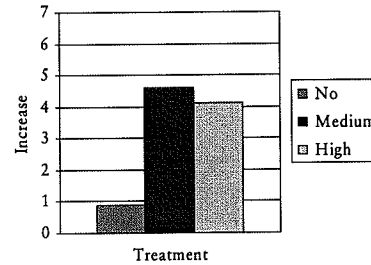
As noted, because the experiment was conducted with paper and pencil mazes rather than with computer mazes, subjects had an opportunity to cheat or fudge on their answers. One way they could do so was to jump their pencil over a line and complete a maze incorrectly. Another way was to skip a maze and do additional mazes and count them in their total, even though the instructions said they could not count any mazes after an incomplete one. In the first round, twenty-six subjects fudged in maze solving and counted forty-eight mazes as solved that they had not solved properly. There was no statistical difference in the number of people or mazes in which respondents fudged or cheated across the groups by their classification in the second round. By contrast, in the second round, nearly three

Changes in numbers of mazes

A: Mean score increase from Round 1 to Round 2 for full information treatments

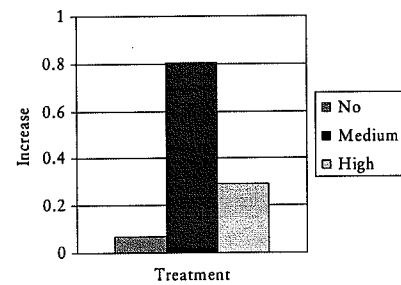


B: Mean score increase from Round 1 to Round 2 for no information treatments



Changes in number of mazes, where person cheated

A: Increase in cheating per person from Round 1 to Round 2 for full information treatments



B: Increase in cheating per person from Round 1 to Round 2 for no information treatments

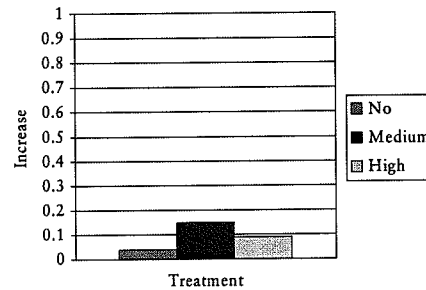


EXHIBIT 5 Changes in numbers of mazes solved and in numbers where person cheated by incentive treatment and information (per person)

times as many people (76) fudged/cheated on 151 mazes, with a distinct pattern across the treatments. The bottom panel of Exhibit 5 shows that in the full-information case, the largest increase in fudging/cheating occurred for the middle-inequality incentive group, in which all subjects can gain by doing better. Moreover, there is much less cheating and little difference among the groups in the no-information case.

In sum, in the maze tournament, when people know where they stand relative to others and can thus roughly estimate how much they might gain from doing better, inequality/incentives operate to produce the inverted U-pattern shown in Exhibit 2. We decomposed the gains by the position of persons in the distribution of maze-solving and showed further that the

difference in the increased number of mazes ~~solved/fudged on mazes across the incentives~~ is driven by persons in the distribution of maze-solving most likely to be affected by the different incentives given by the treatments. For instance, the increased maze solving in the medium-inequality treatment occurs largely among persons in the bottom of the distribution of mazes solved in the first round. Those are the subjects who can gain from doing better in this treatment. In the high-inequality or no-inequality treatments, where subjects are unlikely to gain from moderately better performances, there is no comparable change in mazes solved among persons in the bottom.

While this is the only experiment with which I am familiar to focus on the predicted inverse-U inequality/output relation, previous experimental investigations of tournament incentive schemes, in which subjects are given "cost-of-effort" functions instead of performing real tasks such as maze-solving, show considerable responsiveness to incentives in ways that would produce inverse-U relations. Harbring and Irlenbusch compare a tournament in which one prize is given to the winner and the sum of the prizes is smaller, with a tournament in which two prizes are given and the sum of the prizes is larger. Subjects put forth more effort in the setting with higher total prize money and multiple prizes.¹⁴ Nalbantian and Schotter find that relative performance schemes outperform target-based schemes.¹⁵ Müller and Schotter find that some participants work hard in tournaments while others effectively drop out.¹⁶ Analogous results to ours are also found in the context of all-pay auctions, which have the same incentive structure as tournaments.¹⁷ The Niederle and Vesterlund experiment, which also has subjects perform a real-effort task (addition problems), focused on the supply decision of men and women to enter a tournament rather than on the response of subjects to variations in tournament incentives. This experiment found different responses of the genders to incentives.¹⁸

In contrast to these results, there are some psychology experiments that point out the limitations that extrinsic incentives, such as economic rewards, have in motivating behavior. In *Punished by Rewards*, Alfie Kohn uses these studies to argue against employee incentive plans and thus against inequality as incentives.¹⁹ My reading of the experiments in this area is different than his. Some of the studies that convince him that extrinsic rewards such as money do not work show people behave in a specified way when they are rewarded but desist from that behavior once the rewards are removed. This may be disturbing to someone who wants to alter people's long-term

We decomposed the gains by the position of persons in the distribution of maze-solving and showed further that the difference in the increased number of mazes solved and fudged is driven by persons in the distribution of maze-solving most likely to be affected by the different incentives given by the treatments.

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attitudes, but not to an economist. For better or worse, most economic analysis is based on people with fixed preferences responding to rewards, not on changes in preferences and long-term behavior irrespective of ensuing rewards. The prediction of economics is that workers will do more of X when X is rewarded and more of Y of when Y is rewarded. Another set of studies argues that extrinsic rewards undermine intrinsic motivation, so that in the long run economic incentives are bad. Some experiments reward/pay children to play with toys and then examine whether they choose those toys later. Without gainsaying the specific experimental results (which may be confusing declining marginal utility from playing with toys with the hypothesized negative effect of rewards on intrinsic desire), such experiments do not tell much about economic incentives to work, which are designed to induce people to choose onerous and less desirable tasks. And the opposite pattern is also found in some learning experiences: we reward someone to go through the difficult task of learning a language—with good grades, gold stars, whatever—and then they go on to enjoy the period of speaking, reading, and using it later.

Ariely et al. show, under some conditions, extremely high reward levels can reduce performance.²⁰ This is presumably because overarousal, nervousness, or “choking” undermine the relationship between effort and performance. If extremely high rewards lead to such overarousal, then the incentive-output relationship will again assume a curvilinear form.

Finally, consider what would happen in an educational setting if some faculty conducted the following experiment in grading classes. In one class, the professor announces that everyone would get a B grade regardless of performance. In another class, the professor announces that the best student would get an A and everyone else would fail. In a third class, the professor announces that grades would follow a grade curve, with the top 20 percent getting As, the next 40 percent getting Bs, the next 30 percent Cs, and 10 percent would fail. Measuring class output by the total number of correct answers on a final exam, in which case do you imagine output would be highest? Every time I have asked colleagues and friends in academe what they would expect, I get the same answer: virtually no output in the first case, with many students skipping the irrelevant exam; large dropout from the second class and mass student protest by those who could not switch to some other class; and the largest number of correct answers in the third case. This is the inequality/incentive inverse-U relation.

OPTIMAL INEQUALITY

Economics does not privilege the output-maximizing level of inequality as the level of inequality that society should seek. The level of inequality is a social good about which individuals can have legitimate varying preferences. A Rawlsian would favor an income distribution that improved the well-being of the very poor even if it lowered the income of most citizens; the average citizen would presumably favor an income distribution that gave more to the middle of the distribution, while the self-made entrepreneur would presumably favor a more unequal distribution to ones that privileged the very poor or the average citizen. The contribution of economists to discussion of inequality in society is to point out the cost of attaining different levels of inequality in terms of reduced incentives and lower social output. If the cost of lowering inequality is modest, even many economists enamored of incentives would, I believe, favor policies that benefit the poor at the expense of the rich. The debate among economists over the minimum wage is not over the goal of raising the incomes of low-income workers but of the possible loss of jobs from the minimum, which harms some low-income workers, and of the potential greater efficacy of other modes of intervening on their behalf—for instance, through an Earned Income Tax Credit.

To be sure, economists are leery about interpersonal comparisons of utility, but the declining marginal utility of income that helps explain individual behavior fits naturally with the commonsensical view that poor persons value additional money more than the Rockefellers and thus getting more resources to the poor should weigh more heavily in the social maximand. Analyzing risk behavior, financial economists assume that people have utility functions in which the marginal utility of income falls fairly sharply and often recognize that people “require” a base level of income for an acceptable standard of living, so that there is high marginal utility at low levels of income.²¹ Economists aside, the inequality in the income distributions suggests that the median voter is likely to prefer less inequality than the market generates and thus that in a democracy the socially desired level of inequality will be less than the output-maximizing level. Exhibit 2 displays this relation by locating the desired (fair) level of inequality, F , to the left of I^* . With this specification, society pays a price in efficiency for a “fairer” income distribution, giving the equity-efficiency trade-off.

The trade-off is reflected in the slope of the inequality-output curve, which increases the further one moves from I^* to other levels of inequality.

WHERE DOES THE UNITED STATES STAND?

The natural question to ask next is how income inequality in the United States compares to the output-maximizing level and to the socially desirable level. This is difficult to answer. There is no natural way to move from small laboratory experiments, such as that in the maze tournament, to measured levels of inequality in society. What is clear is that the United States has the highest level of inequality among advanced countries. Indeed, the level of inequality in the United States exceeds that in many developing countries, where as noted inequality tends to be higher than in advanced countries. My suspicion is that the level of inequality exceeds the output-maximizing level, and that many of the ways in which top earners make their money in response to incentives are counterproductive—giving them reasons to fudge financial reports, hide bad outcomes through financial chicanery, release good news when they can cash in their options, and otherwise exploit the incentive compensation system rather than to act productively. The recent financial crisis might be partly interpreted in just those terms.

One reason for my suspicion is that so much of recent inequality has taken the form of huge increases in earnings at the top of the income distribution, where incentives are already larger than for any other workers. It is hard to imagine that top CEOs need increasingly more pay to motivate them. Another reason is that some of the rise of inequality occurred through modes of payment that do not work as efficient incentives. Much of the high earnings of executives is in stock options that pay off if the firm's share prices rises. They are designed to align the interests of executives with shareholders. But the options are written in ways that seem to raise executive pay regardless of their actual performance. Options pay off when share prices rise above some specified absolute level, so that if inflation or reductions in interest rate raise the prices of all shares, the options increase in value, and even executives in low-performing firms are richly rewarded. When the stock of a company falls, moreover, stock options are often repriced, which gives a perverse incentive to add volatility to share prices. In summer 2006 a new scandal regarding options surfaced that shocked even aficionados of executive compensation. This is the backdating of options,

by which a firm gives shares to executives when share prices are high, and backdates the option as if it had been granted earlier when share prices were lower.

Economists aside, how do the American people see inequality? Do they appreciate the incentive effects? Are they favorable to efforts to reduce U.S. inequality?

First, the facts: Inequality began rising in the United States in the late 1970s/early 1980s and continued increasing through the early 1990s, stabilized or fell slightly in the 1990s' boom, and then drifted upward in the 2000s, depending on the measure of income and of inequality. In 1979 the top 10 percent of wage and salary workers earned 3.5 times per hour what the bottom 10 percent earned. In 2005 the top 10 percent earned 5.8 times as much as the bottom 10 percent.²² In 1979 college graduates earned 1.4 times as much as high school graduates. In 2005 college graduates earned 1.74 times as much as high school graduates.²³ In 1980 the pay of CEOs was about 42 times that of average workers. In 2004, CEO pay was 262 to 431 times the pay of an average worker, depending on whose estimates of CEO pay one takes.²⁴

In the 1980s, the rise in inequality was roughly equally divided between decreases in the income of the lower paid relative to the median and increases in the income of the higher paid relative to the median. This polarization of the income distribution generated widespread concern about the decline of the middle class. When the top of the earnings distribution and the bottom of the earnings distribution pull away from the middle, almost any measure of the middle class will show a declining proportion of workers in the middle.

In the 1990s, the increase in inequality took a very different form: huge increases in the earnings of persons at the very top of the income distribution compared to everyone else. Between 1987 and 2005, the wages of persons in the upper 5 percent of the wage distribution increased from 2.5 times the median to 2.9 times the median earnings. But the gains of the upper 5 percent were not equally shared. The upper 1 percent gained relative to the rest; and within the upper 1 percent it was the upper one tenth of one percent who did really well. It was a great time to be super-wealthy.

The increase in inequality in the United States was sufficiently large that despite healthy economic growth, the living standards of most workers stagnated or declined, breaking with the historic pattern in which real wage

growth tracked productivity growth. The rate of poverty barely changed despite increased GDP per capita. It was not a great time to be a normal worker.

To see how Americans view inequality and its rise, I examined the results of two surveys of attitudes toward inequality (see Exhibit 6). The first survey comes from the Campbell Public Affairs Institute of Syracuse University, which has conducted surveys on American attitudes toward inequality since 2004. The 2006 Campbell survey showed that most Americans recognized that inequality was increasing, and that many were worried about its impact on the society. Seventy-one percent said that the United States was becoming a nation of haves and have-nots. Asked whether inequality was a serious problem, an increasing proportion reported that it was a very serious problem, while, asked about the factors that led to achievement, a decreasing proportion believed that abilities and hard work were the key to achievement. Finally, an increasing proportion of Americans favored more government efforts to reduce inequality. The survey shows striking political

EXHIBIT 6

Percentage of Americans with specified attitudes toward inequality and toward the role of ability and hard work in economic achievement

	2004	2005	2006
INEQUALITY AS A PROBLEM			
Serious problem	38.3	46.8	51.6
Somewhat of a problem	43.1	38.5	30.6
Not much of a problem	17.1	12.6	15.3
No opinion	1.6	2.0	2.6
DETERMINANTS OF ACHIEVEMENT			
Family background	7.5	11.6	13.2
Both	27.3	27.6	0.4
Abilities and hard work	63.2	59.8	45.4
No opinion	2.0	1.1	2.0
DIRECTION OF GOVERNMENT EFFORTS TO REDUCE INEQUALITY			
More	53.8	55.1	61.5
About what done now	22.4	19.0	18.6
Less	17.5	21.5	14.5
No opinion	6.3	4.4	5.4

SOURCES: Maxwell Polls 2004–2006, Campbell Public Affairs Institute, based on questions: “Do you see the current extent of income inequality in our society as a serious problem, somewhat of a problem, or not much of a problem?”; “Do you think what you achieve in life depends largely on your family background, or on your abilities and hard work?”; “Should government do more to try to reduce inequality, about what it is doing now, or less than is done now?” Jeffrey Stonecash, “Inequality and the American Public,” Results of the Third Annual Maxwell School Survey Conducted September–October 2006, Working Paper 2006-01. Revised January 2007.

39.4

polarization around these issues, with Republicans seeing inequality as a modest problem about which government should do little, while Democrats and independents view it as a problem about which something should be done.

The second survey comes from the 1999 International Social Science Programme Survey (ISSP). Each year members of the ISSP carry out the same survey around the world focused on a particular issue. In 1999 the issue was social inequality. The ISSP surveyed respondents in about twenty-five countries on various aspects of inequality and their views of it. I categorized three statements from the survey as reflecting perceptions of the role of incentives as inequality: people get rewarded for effort; people get rewarded for skill; and people study to earn a lot of money. Many more Americans agree than disagree with these statements, indicating widespread recognition of the incentive role of inequality. On the first two statements, moreover, Americans are far more likely to agree than the citizens in the other countries in the survey. I categorized two statements as reflecting perceptions of inequality as inequity: inequality continues to exist to benefit the rich and powerful; and to get to the top, you have to be corrupt. Americans are much less likely to agree with these statements than persons in other countries. Overall, Exhibit 7 shows that Americans may be closer to economists than to persons in other countries in their views of the relative importance of incentives and inequity in inequality. This would be consistent with the United States accepting greater inequality than other countries, though with levels of inequality coming to exceed those in many developing countries, this tolerance may be changing.

CONCLUSION

Inequality is Janus-faced. On the one side, it is an incentive that motivates people to produce more and to undertake productive tasks that they might otherwise have rejected. Economists stress the role of inequality as incentive. On the other side, inequality creates differences in living standards that many view as inequitable. Non-economists stress the role of inequality as inequity. The analysis in this essay has brought these two visions of inequality together. It has shown that inequality is an incentive for greater production up to a point—the output-maximizing level of inequality, beyond which additional inequality reduces total output. It has further argued

EXHIBIT 7
Americans see inequality more as incentives than as inequity

	U.S. (n = 1,272)		ALL COUNTRIES (n = 34,178)	
	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)
INCENTIVE INEQUALITY				
People get rewarded for effort	61	11	33	45
People get rewarded for skill	69	8	40	35
People study to become lawyers or doctors to earn a lot more than ordinary workers ^a	58	22	68	16
INEQUITY INEQUALITY				
Inequality continues to exist because it benefits the rich and powerful	45	20	66	14
To get to the top, you have to be corrupt	16	56	34	41

SOURCE: Tabulated from International Social Science Programme Survey ISSP 1999, "Social Inequality III," ZA No. 3430, http://www.gesis.org/en/data_service/issp/data/1999_Social_Inequality_III.htm.

^a I reverse-coded this for ease of interpretation. The actual question was no one would study for years to become a lawyer or doctor unless they expected to earn a lot more than ordinary workers.

that the socially ideal level of inequality will tend to be lower than the output-maximizing level, generating an equity-efficiency trade-off.

The difficult problem is in moving from the theory and experimental evidence to the actual status of inequality in the United States or in other countries. From the 1970s through the 2000s, inequality rose greatly in the United States, placing the country at the top of the league tables in inequality. While Americans are more attuned to inequality as incentive than persons in most other countries, survey evidence shows rising concerns over the level of inequality. As noted, I suspect but cannot prove that inequality has gone past the output-maximizing level. For the typical American, who has obtained just a small share of the gains of economic growth, inequality has almost certainly gone past the level that maximizes his or her income. The country has experimented with tax cuts and spending decisions favoring high-income citizens with the result that they have benefitted handsomely, while earnings growth has been relatively stagnant for most of the rest of the population. If future U.S. governments experiment with tax and fiscal policies favorable to the average citizen, shifting incentives down the income distribution as in the middle-inequality maze experiment, my guess is that the economy will grow as or more rapidly than it would with continued policies that privilege the wealthy few. If I am wrong and policies

that gave more income to the average citizen reduced aggregate growth, I expect that the average citizen would still benefit. A policy that reduces the billionaire's income by, say \$100 million, but increases the income of regular workers by \$90 million and thus lowers GDP by \$10 million would seem to be socially more desirable than policies that increase the billionaire's income by \$100 million at the expense of \$90 million of lost income for others, even though the result is a \$10 million increase in GDP. Of course, some billionaires might disagree with this statement about the location of the "fair" income distribution shown in Exhibit 2.

services that are locally generated and consumed in developing countries, relative to internationally traded goods and services.

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