taxanalysts / **tax break**

by William G. Gale and Peter R. Orszag

Bush Administration Tax Policy: Effects on Long-Term Growth

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I. Introduction

This article is the fourth in a series that evaluates tax policy in the Bush administration and focuses on how making the 2001 and 2003 tax cuts permanent would affect long-term economic performance.[1]

Tax policy can change the size of the future economy in either of two ways: by affecting the underlying growth *rate* or by creating a one-time permanent shift in the level of economic activity (without affecting the underlying growth rate). In this article, both effects will be considered to imply an effect of taxes on long-term economic growth. The tax cuts' effects on long-term economic performance, however, is distinct from their ability to stimulate the economy in the short run. In the short run, in an economy operating with excess capacity, increases in aggregate demand can raise output and income even without increasing the capital stock. In the long run, however, economic growth reflects increases in the capacity to generate income through technological change, and the increased supply and better allocation of labor and capital. A subsequent article in this series will address the short-term, stimulative effect of the tax cuts.

The net effect of the tax cuts on growth is theoretically uncertain. The tax cuts certainly offer the potential to raise economic growth by improving incentives to work, save, and invest. But the tax cuts also create income effects that reduce the need to engage in productive economic activity, and they subsidize old capital, which provides windfall gains to asset holders that undermine incentives for new activity. Also, making the tax cuts permanent would raise the deficit over the medium term, in the absence of any offsetting revenue increases or

spending cuts. The increase in the deficit will reduce national saving — and with it, the capital stock owned by Americans and future national income.

Several studies have quantified the effects noted above in different ways and used different models, yet all have come to the same conclusion: Making the tax cuts permanent is likely to reduce, not increase, national income in the long term unless the reduction in revenues is matched by an equal reduction in government consumption. And even in that case, a positive impact on long-term growth occurs only if the spending cuts occur contemporaneously, which has decidedly not occurred, or if models with implausible features (like short-term Ricardian equivalence) are employed.

Section II discusses the channels through which tax policy can affect economic growth. Section III discusses how well the 2001 and 2003 tax cuts exploit those channels. Section IV surveys aggregate analyses of the tax cuts' effects on growth. Section V discusses evidence from "bottom-up" studies and analysis of particular sectors, like corporations and entrepreneurs. Section VI discuss other perspectives on taxes and growth. Section VII provides concluding remarks.

II. Taxes and Growth: Channels of Influence

Over the long term, tax cuts influence the economy through several channels. First, they affect the behavior of individuals and businesses. The positive effects of tax cuts on growth arise because lower marginal tax rates increase the reward to working, saving, and investing. Holding real income constant, these lower marginal rates induce more work effort, saving, and investment through substitution effects. That is typically the "intended" effect of tax cuts on growth, and it is certainly the effect that is emphasized by advocates of tax cuts. But it is by no means the only effect, nor is it necessarily the largest effect.

Tax cuts may also provide positive income (or wealth) effects, which reduce the need to work, save, and invest. An across-the-board cut in income tax rates, for example, raises the marginal return to work — which raises labor supply through the substitution effect — but it also raises a household's after-tax income at every level of labor supply, which reduces labor supply through the income effect. The net effect on labor supply is ambiguous. Similar potentially offsetting effects also apply to saving.

Tax cuts or well-designed reforms may also reduce the extent to which taxpayers legally avoid and illegally evade taxes. That can improve the allocation of resources and therefore raise economic growth even without increasing the level of labor and capital inputs. But tax cuts can also potentially exacerbate distortions in the economy, especially if the tax cuts are narrowly targeted.

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[1]The previous installments provide background information, examine distributional effects, and examine the tax cuts in the context of budget policy (Gale and Orszag 2004a, b, and c).

Besides their effects on private agents, tax cuts also affect the economy through changes in federal finances. Without other policy changes, tax cuts are likely to raise the federal budget deficit, which in turn is likely to reduce national saving, and hence the capital stock owned by Americans and future national income. The increase in the deficit is also likely to raise interest rates. Those changes — lower national saving and the associated increase in interest rates — create a fiscal drag on the economy's ability to grow. Eventually, though, any permanent tax cut must be financed by some combination of future spending cuts or future tax increases, and those policy changes will influence the effect of the original tax cut on economic growth. Because fiscally unsustainable policies can not be maintained forever, the future financing of a tax cut must be incorporated into analyses of the effect of the tax cut itself.

Federal tax cuts can also generate responses from other governmental entities — including the central bank, state governments, and foreign governments. In particular, the potential responses of foreign governments are often overlooked. Cuts in U.S. taxes that induce capital inflows from abroad, for example, may encourage other countries to reduce their taxes to retain capital or attract U.S. funds. To the extent that other countries respond, the net effect of capital income tax cuts on growth will be smaller than otherwise.

In summary, while there is no doubt that tax policy can influence the economy, it is by no means obvious that a tax cut will ultimately lead to a larger economy. A fair assessment would conclude that well-designed tax policies can raise growth, but there are many stumbling blocks along the way, and certainly no guarantee that all tax cuts will improve economic performance.

III. Were the Tax Cuts Well-Designed for Growth?

Given the various channels through which tax policy affects growth, a growth-inducing tax cut would involve minimal increases in the budget deficit, to avoid the long-term fiscal drag created by lower national saving and higher interest rates, and a pattern of substitution and income effects that encouraged increased supply of labor and capital and reduced consumption, including careful targeting of tax cuts on *new* economic activity, rather than providing windfall gains for previous activities. The 2001 and 2003 tax cuts score poorly on these criteria.

A. Deficits

If the 2001 and 2003 tax cuts are made permanent (and the alternative minimum tax is adjusted so that the number of people on the AMT in each year is the same under the extended tax cuts as it would have been in that year under pre-2001 law, the adjustment described and justified in Gale and Orszag (2004a)), the 2001 and 2003 tax cuts will increase the federal debt by $4.4 trillion in 2014, or by 24 percent of gross domestic product in that year. That will significantly reduce income and raise interest rates in that year and future years and hence make the environment for long-term growth more difficult.

To calibrate the effect on national income, note that President Bush's Council of Economic Advisers (CEA) (2003, Box 1-4) reports that "one dollar of [public] debt

reduces the [domestic] capital stock by about 60 cents." The CEA calculations imply that the domestic capital stock will fall by $2.6 trillion by 2014 because of the deterioration in the fiscal outlook attributable to the tax cuts if they are extended, even without considering the greater foreign ownership of that capital. If the return to capital is 6 percent, then GDP will be lower in 2015 by $156 billion than it otherwise would have been, or about 0.8 percent of projected GDP (see CBO 2004), because of the effects of the tax cut on the deficit. More importantly, since private saving would plausibly offset perhaps one-quarter of the increase in public debt,[2] the capital stock owned by Americans would decline by $3.3 trillion (75 percent of the $4.4 trillion in additional public debt), so that national income in 2015 will be almost $200 billion lower (slightly more than 1 percent of projected GDP). That translates into a cost of more than $1,000 per household in that year alone and would continue indefinitely.

To calibrate the effect of the deficits on interest rates, note that recent estimates by Engen and Hubbard (2004) imply that an increase in the ratio of the public debt to GDP by 1 percentage point raises real interest rates by 3 basis points. If so, the deficits created by the 2001 and 2003 tax cuts, if they are made permanent (and the AMT adjusted), would raise interest rates by 72 basis points in 2014. Our own estimates, in Gale and Orszag (2004e), find that real long-term interest rates rise by between 44 and 67 basis points per percent of GDP in increased primary deficits. Since making the tax cuts permanent would raise the primary deficit by about 2 percent of GDP, our findings suggest that the impact on interest rates would be somewhere between 80 and 130 basis points. Higher interest rates will tend to reduce investment.

Notably, the adverse effects of the accumulated public debt on national saving and interest rates would persist in years after 2014. As a result, the deficits created by the tax cuts create both a drag on future growth prospects, and a large hurdle for the incentive effects of the tax cuts to overcome to raise economic growth. Unfortunately, the tax cuts are not well-designed to overcome those obstacles.

B. Income and Substitution Effects

The effects of the tax cuts on marginal tax rates are surprisingly small. Using the Treasury Department's tax model, Kiefer et al. (2002) show that the 2001 tax cut, when fully phased in, will provide no reduction in marginal tax rates for 76 percent of tax filing units (including nonfilers), 72 percent of filers, and 64 percent of those with positive tax liability would receive no reduction in marginal tax rates. Those taxpayers account for 38 percent of all taxable income. Kiefer et al. found

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[2]For example, the Congressional Budget Office (1998) concludes that private saving would rise by between 20 to 50 percent of an increase in the deficit. Elmendorf and Liebman (2000) conclude that private saving would offset 25 percent of an increase in the deficit. Gale and Potter (2002) estimate that private saving will offset 31 percent of the decline in public saving caused by the 2001 tax cut.

that the marginal tax rate on *taxable* wages, interest, dividends, and sole proprietorship income fell by between 1.6 percentage points and 2.4 percentage points. The *economywide* reduction in taxes on capital income, however, is likely to be significantly smaller, since a substantial share of such income flows to nontaxable entities like pension funds and nonprofits. For example, CBO (2001) found economywide declines of just 0.5 percentage points for capital income. CBO (2003) estimates that, by 2011, the combined effects of the 2001 tax cuts and the 2003 tax cuts proposed by the president — including complete abolition of individual income taxation of dividends — would reduce the average effective marginal tax rate on labor income by 1.5 percentage points, and the average effective marginal tax rate on capital income by 1.5 percentage points. Since the 2003 tax cut reduced, but did not abolish, the individual income tax rate on dividends, the implied reduction in the marginal effective tax rate on capital is smaller than 1.5 percentage points. Our calculations using the Tax Policy Center (TPC) microsimulation model indicate that, if both the 2001 and 2003 tax cuts were made permanent (with the AMT adjustment noted above), 60 percent of filers, who collectively represent more than 40 percent of taxpayers and report 30 percent of all taxable income, would not see a reduction in marginal tax rates, relative to pre-Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) law. Households that do not receive reductions in marginal tax rates are typically either on the AMT or in the 15 percent bracket. That suggests that the positive incentives from the tax cuts on labor supply, saving, investment, and so forth are likely to be limited.

The tax cuts also created positive income effects that will reduce labor supply, saving, and investment. First, the creation of the new 10 percent bracket will generate positive income effects for all income taxpayers; the expansion of the child credit creates income effects for many taxpayers with children; and the marriage penalty relief provisions generate positive income effects for many married taxpayers. Calculations using the TPC microsimulation model indicate that if the tax cuts were made permanent (and the AMT adjusted), 44 percent (50 million) of all filers with an income tax cut, representing 34 percent of taxable income, *would* receive a net tax cut but would *not* receive a reduction in marginal tax rates on wages in 2010. Of those, 7.7 million actually face increases in marginal tax rates. (These are taxpayers pushed on to the AMT.) All of those households would receive positive income effects (higher after-tax income) but either no substitution effect or a negative substitution effect. For all of those households, the tax cuts would likely reduce labor supply.

Second, besides creating positive income effects but not substitution effects for many taxpayers and not reducing marginal tax rates substantially, the 2001 and 2003 tax cuts did not do a good job of targeting new investment. The important issue is that the reductions in dividends and capital gains taxes reward not only new investment, but also the returns to old investment. Therefore, much of

their potential impact on growth is diluted by providing windfall gains to owners of existing capital.[3]

In summary, the recent tax acts do not appear to be well-designed to generate growth. They create large deficits, which burden the economy with lower national saving and higher interest rates. They provide relatively small reductions in marginal tax rates. They create positive income effects, but no substitution effects, for many taxpayers, which actively discourages labor supply and saving. They create windfall gains for the owners of old capital, which further discourages productive supply-side responses.

IV. Aggregate Analyses

Formal analyses confirm the intuition developed above that the tax cuts are poorly designed to stimulate long-term growth. Auerbach (2002) uses an overlapping generations life-cycle model (developed in Auerbach and Kotlikoff 1987) to examine the long-term effects of the 2001 tax cuts, noting that they must eventually be financed with either tax increases or spending cuts. He shows that the long-term effects on the size of the economy depend on when the financing begins and what form the financing takes. If the financing begins after 10, 15, or 20 years, and takes the form of increased wage taxes or capital taxes, the net effect will be to reduce the long-term size of the economy. After 20 years, the economy is smaller under each of those scenarios by between 0.4 percent and 1.2 percent. In the long term (about 150 years), the decline in the size of the economy ranges between about 0.6 percent and more than 2 percent.

The tax cuts could also be financed with spending cuts. Auerbach shows that if the *entire* tax cut is financed by *immediate* reductions in government consumption — so that the tax cut does not create any deficits to begin with and does not reduce government investments in, say, health, human capital, or infrastructure — the tax cut does raise the long-term capital stock per capita, but the long-term increase is just 0.5 percent. However, if only half of the tax cut is financed *immediately* on enactment with reductions in government consumption, and the remaining shortfall is made up beginning 10 years after enactment with capital income taxes, the long-term capital stock per capita is lower than it would have been without the tax cut. Because it seems clear that reductions in government consumption over the last few years did not finance the tax cuts (because those reductions did not occur[4]), Auerbach's analysis implies strongly that the impact on long-term growth will be negative.

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[3]For example, studies of the effects of consumption taxes on growth show that whether a windfall gain is provided to owners of existing capital in the transition to a new system has a very large impact on the effects of tax reform on long-term growth. *See, e.g.*, Altig *et al.* (2001).

[4]Between fiscal year 2000 and fiscal year 2004, federal noninterest outlays rose by 2.5 percent of GDP and a new entitlement, the Medicare prescription drug benefit, was created. It is possible that spending would have increased even more during this period had the tax cuts not been enacted, but it seems unlikely.

Two other studies use large macroeconometric models to examine the long-term effects of the tax cuts.[5] Elmendorf and Reifschneider (2002) use a rational-expectations, open-economy model based on the Federal Reserve Board model of the economy. Although their main focus is on the short-term effects of tax cuts, they also show that their model implies that a sustained cut in personal income tax rates would reduce the long-term size of the economy relative to the baseline. A recent analysis by Zandi (2004) reaches similarly pessimistic conclusions about the long-term effects of making the tax cuts permanent.[6]

The most comprehensive aggregate analysis of the long-term effects of tax cuts was undertaken by 12 economists at CBO (Dennis et al., 2004). That study examines the effects of a generic 10 percent statutory reduction in all income tax rates, including those applying to dividends, capital gains, and the AMT. Although the authors do not examine the 2001 and 2003 tax cuts per se, the study is quite useful for evaluating making the tax cuts permanent. In particular, because the CBO study focuses on "pure" rate cuts, rather than the panoply of additional credits and subsidies enacted in EGTRRA, the growth effects reported probably overstate the impact of making the 2001 and 2003 tax cuts permanent. In the tax cut they examine: (a) *every* taxpayer receives a reduction in marginal tax rates, so 100 percent of taxable income is affected, as opposed to 62 percent, for example, under EGTRRA, as discussed above and (b) there are no positive income effects from provisions other than marginal tax rates cuts, again unlike EGTRRA and Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA). As Dennis et al. (2004) write, "the reduction in marginal tax rates is large compared with the overall budget cost."

The study uses three different models to examine the long-term effects: a closed-economy overlapping generations (OLG) model; an open-economy OLG model; and the Ramsey model. The authors assume that the tax cuts are financed either by reductions in government consumption or increases in tax rates. In either case, the financing begins after 10 years and increases gradually for another 10 years and then is stabilized. Thus, deficits are allowed to build for the first decade of the tax cut and much of the second decade as well.

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[5]House and Shapiro (2004) provide an interesting analysis of how the tax cuts might have had stronger short-term effects if they had been phased in more quickly, but their analysis assumes every tax change is financed by changes in lump-sum taxation, and so does not address the long-term effects of the deficits that would be created by making the tax cuts permanent.

[6]Zandi (pp. 7, 9) states that: "Optimism that if the President's tax cuts are made permanent that they would create powerful incentives for more investment and harder work and thus ultimately more tax revenues and an improving long-term fiscal situation is misplaced. . . . Deficits of the size that would ensue if the tax cuts are made permanent will have serious negative long-term economic implications. . . . Investment, productivity growth, and ultimately the nation's living standards would all be measurably weaker, and a more substantive fiscal crisis would eventually ensue."

The results are reported in Table 1.[7] In the three scenarios in which the tax cuts are financed by increases in income taxes, the long-term effects are generally negative. In the Ramsey model and the closed-economy OLG model, GDP and fall significantly. In the open economy OLG model, GDP rises slightly (0.2 percent), but GNP falls by even more than in the other models. The open economy results occur because tax cuts reduce national saving and hence increase capital inflows. The inflow, in conjunction with increased labor supply, is sufficient to slightly raise the output produced on American soil. The capital inflows, however, must eventually be repaid and doing so reduces national income (GNP), even though domestic production rises. Ultimately, of course, future living standards of Americans depend on GNP, not GDP (Elmendorf and Mankiw 1999).

Table 1 Long-Term Effects of a 10 Percent Cut in Income Tax Rates (Percentage Change in GDP and GNP)				
	Financed By:			
	Cuts in Spending		Increase in Income Tax	
Model	GDP	GNP	GDP	GNP
OLG - Closed*	-0.1	-0.1	-1.5	-1.5
OLG - Open	0.5	-0.4	0.2	-2.1
Ramsey*	0.8	0.8	-1.2	-1.2
Source: Dennis, et al (2004), Table A-2 and conversation with David Weiner.				
* GNP and GDP are the same in these models.				

In the three scenarios in which the tax cuts are financed with cuts in government consumption, the effects are more positive. In the closed-economy OLG model, there is virtually no effect on growth. In the open-economy OLG model, GDP rises by 0.5 percent in the long run, but GNP falls by 0.4 percent.[8] The sole uniformly positive case for growth case occurs when (a) the tax cuts are financed by reductions in government purchases *and* (b) the policy is run through the Ramsey model, in which case long-term GDP would rise by about 0.8 percent.[9] However, as the authors note (Dennis et al. 2004, p. 9), the Ramsey model implies that the reduction in government saving due to the tax cuts in the first decade is matched one for one with increases in private saving. Empirical evidence rejects this view (see Gale and

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[7]We thank David Weiner and Robert Dennis for providing the gross national product results, which are not provided in the report.

[8]Those findings are consistent with CBO Director Douglas Holtz-Eakin's statement that the net effect of the tax cut on long-term growth would be "modestly negative" (Catts 2004. *See also* Andrews 2004 and Weisman 2004).

[9]In Gale and Orszag (2004b), we noted that a long-term effect of the tax cuts on economic growth of 1 percent exceeded all estimates in the literature. The 0.8 percent increase in long-term growth reported in Table 1 is the largest estimate of which we are aware.

Orszag 2004e).[10] Also, if that result did hold, it would imply that households did not spend any of their tax cuts in 2001, 2002, and 2003, a proposition that has been rejected in a recent analysis (Johnson, Parker, and Souleles 2004).

V. 'Bottom-Up' or Sectoral Analyses

"Bottom-up" analyses (the terminology is from Slemrod 1995) obtain estimates of the growth effects of tax cuts by examining the effects on each sector and summing the effects. These studies also offer the chance to focus on particular sectors of the economy.

A. Lower National Saving Versus Better Incentives

Our previous work in this area has concluded that the 2001 tax cuts would generate negative effects on long-term growth. Orszag (2001) used estimates from Gruber and Saez (2000) on the elasticity of "broad" income, a concept similar to national income, with respect to marginal tax rates. That elasticity suggested a positive effect on the size of the economy of 0.4 percentage points to 0.5 percentage points in 2012 from the reduced marginal tax rates contained in an early version of the 2001 tax cut. Orszag then compared that positive effect to the negative effect on future national income from the reduced national saving associated with deficit-financing of the tax cut. He concluded that the net effect was likely to be a small reduction, of 0.1 percentage points to 0.5 percentage points, in national income in 2012.

Gale and Potter (2002) estimate the long-term effects of making the 2001 tax cut permanent. They combine estimates of the changes in incentives provided by the tax cut with estimates of how tax incentives affect saving, investment, labor supply, and human capital accumulation. They find that those "supply side" effects will raise the size of the economy by almost 1 percent by 2011. Gale and Potter also estimate that the increase in the deficit, due to the tax cuts, will reduce national saving, and the reduction will cause GDP to decline by about 1.6 percent by 2011. After allowing for capital inflows, based on historical relationships, Gale and Potter (2002) estimate that the net effect would be to reduce GDP by about 0.3 percent by 2011 and GNP by 0.7 percent.

An earlier study by Engen and Skinner (1996) estimates that a generic 5 percentage point reduction in

marginal tax rates would raise annual growth *rates* by 0.2 percentage points to 0.3 percentage points for a decade. That calculation is often invoked by supporters of the administration's tax cuts (see Calomiris and Hassett 2002 and Rosen 2004), but it is entirely inappropriate to apply those effects to EGTRRA and JGTRRA. First, the tax cut that Engen and Skinner examine is implicitly financed by immediate reductions in government consumption; there is no fiscal drag created by deficits. Second, the 5 percentage point drop in effective marginal tax rates that they analyze is more than three times as large as the net cuts induced by EGTRRA and JGTRRA, as noted above.[11]

B. Investment and Entrepreneurship

Further insights on the growth effects of making the tax cuts permanent can be derived from considering how making the tax cuts permanent would affect the level of investment, the allocation of capital, and the extent of entrepreneurial activity.

Tax cuts have offsetting effects on the cost of new investments, with marginal tax rate cuts reducing, and higher interest rates from deficits increasing, the cost of capital. Gale and Potter (2002) show that if EGTRRA were to raise interest rates by 50 basis points, the cost of capital would rise for corporate equipment and structures, noncorporate equipment and structures, and owner-occupied housing. By 2014 EGTRRA, if extended, would increase the public debt by just over $3.4 trillion, or about 19 percent of GDP in 2014.[12] That implies an interest rate increase of 57 basis points using the Engen and Hubbard (2004) estimates noted above and larger effects using the Gale-Orszag (2004d) estimates. Thus, recent estimates of the impact of debt on interest rates implies that EGTRRA will raise the cost of capital for new investments and hence reduce investment.

In more recent work (Gale and Orszag 2004e), we show that the net effect of making both EGTRRA and JGTRRA permanent would be to raise the cost of capital once the interest rate effects are taken into account. Those findings imply that making the tax cuts permanent would reduce the long-term level of investment.

Normally, less investment would imply less output. Making the tax cuts permanent, however, would likely improve the long-term *allocation* of the capital stock between corporate and noncorporate uses, which could raise output even with the same or lower level of investment. In particular, the dividend and capital gains reductions could help reduce biases in the allocation of capital by reducing the generally higher tax on capital invested in the corporate sector.[13] Although precise estimates are not available, even supporters of the 2003 tax

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[10]Besides the studies noted in the text, many studies have examined the effects of the tax as legislated, as opposed to permanent tax cuts. CBO (2003, p. 45) finds that "The revenue measures enacted since 2001 will boost labor supply by between 0.4 and 0.6 percent from 2004 to 2008 and up to 0.2 percent in 2009-2013. . . . But the tax legislation will probably have a net negative effect on saving, investment, and capital accumulation over the next 10 years. . . . The laws' net effect on potential output . . . will probably be negative in the second five years." The Joint Committee on Taxation (2003) estimated that a plan very similar to the 2003 tax cut would boost GDP in the short run, but would end up *reducing* GDP relative to the baseline in the second half of the decade. Although the JCT does not report results beyond the 10-year window, the language implies that the growth effect would continue to decline (*see* Burman, Gale, and Orszag 2003).

[11]*See* Gale and Potter (2002) for additional discussion of the Engen and Skinner results and differences between the tax cuts they analyze and the recent tax changes.

[12]This calculation is based on JCT estimates of the effects of EGTRRA as legislated, TPC microsimulation model estimates of the effects of the extending the tax cuts, and debt services costs using the CBO interest rate matrix.

[13]Although *see* Gale and Orszag (2003) and Burman, Gale, and Orszag (2003), for concerns about the ability of the enacted dividend cuts to resolve the double taxation problem, and *see*

(Footnote continued on next page.)

cut acknowledge the benefits of improved allocation of capital are likely to be small.[14] For example, former CEA Chair Glenn Hubbard suggested in a speech at the American Economic Association in January 2004 that the allocative improvements induced by the administration's original proposal would raise the long-term level of GDP by 0.2 percentage points (Hubbard 2004). The dividend and capital gains tax proposal that was actually enacted, however, is inferior to the original proposal, because the enacted proposal does not ensure that corporate income is taxed at least once. The allocative efficiency gains are therefore likely to be smaller under the enacted tax cut than under the administration's proposal. In any case, even if the entire 0.2 percent increase in long-term output is added to "bottom-up" estimates in Orszag (2001) or Gale and Potter (2002), the net effects would be roughly a zero or negative effect on long-term growth. Gravelle (2003) and Zandi (2004) conclude that the net benefits of the dividend and capital gains tax cuts are likely to be quite small, if positive at all.

Although tax cut supporters frequently claim that making the tax cuts permanent would help entrepreneurs, the likely effect is more complex. Small businesses would be doubly hurt. First, their cost of capital for new investments would rise because of the increase in interest rates, so that their overall investment would likely decline, as discussed above. Second, those effects would be accentuated by the dividend tax cut, which could shift investment funds away from non-C-corporation businesses, where entrepreneurs are disproportionately located, and toward C corporations.

Other effects on self-employment and risk-taking are not as clear. The literature does not provide a clear view on whether lower tax rates raise or reduce the desirability of becoming an entrepreneur. Several studies find that higher tax rates raise (or do not reduce) the likelihood of entry into self-employment and reduce (or do not raise) the likelihood of exit from self-employment (see Gentry and Hubbard 2004 for a review of the literature). Gentry and Hubbard (2003) estimate that increased convexity (progressivity) in the tax structure will reduce entrepreneurial activity.

Carroll et al. (1998a, 1998b, 2000) estimate that the Tax Reform Act of 1986 (TRA 86) raised the investment, hiring, and income growth of small businesses. That finding is difficult to apply to the effects of making the 2001 and 2003 tax cuts permanent, however, because TRA 86 involved larger reductions in marginal tax rates and was revenue-neutral. TRA significantly reduced the cost of capital for such businesses, which led to the increased investment. In contrast, EGTRRA and JGTRRA are likely

to raise the cost of capital, once interest rate effects are taken into account, and hence to reduce investment (Gale and Orszag 2004e).

Cullen and Gordon (2002) note several interactions between entrepreneurial activity and tax rates, including the option that small business owners have to incorporate to shelter funds. They find that the direct tax effects of the 2001 tax act reduced self-employment by about one-sixth. They also find that cutting the capital gains tax rate raises entrepreneurial activity, and higher interest rates reduce that activity.

C. The Estate Tax

All of the studies above omit the estate tax from consideration, in large part because of the substantial uncertainty over how estate tax changes would affect growth and in particular on how to model the impact of estate taxes on wealth accumulation, since the proper model depends on why people give transfers in the first place, an issue that has not been resolved in the research literature. Gale and Slemrod (2001) review the literature on how the estate tax affects saving, labor supply, and entrepreneurship by potential decedents and potential and actual recipients. They conclude that the strongest claims about the negative impact of the estate tax on wealth accumulation by potential decedents are at best unsubstantiated and depend critically on motives for giving transfers, that there is strong evidence that receipt of inheritances raises the consumption and reduces the labor supply of recipients (implying a channel through which estate taxation can raise growth), and that the effects on small businesses are largely overstated.

VI. Other Evidence on Taxes and Growth

The argument that tax cuts raise growth is repeated so often that analyses that show or claim the opposite are often rejected out of hand. The earlier sections, however, provide both the logic and evidence that suggests that making the 2001 and 2003 tax cuts permanent would probably harm long-term growth. In this section, we present several additional perspectives suggesting that tax cuts should not raise economic growth and that poorly designed tax cuts could well reduce it.

Perhaps most strikingly, historical data show huge shifts in taxes with no observable shift in growth rates. From 1870 to 1912, the United States had no income tax and tax revenues were just 3 percent of GDP. From 1947 to 1999, the highest income tax rate averaged 66 percent, and federal revenues were about 18 percent of GDP. Also, estate and corporate taxes were imposed at high marginal rates and state taxes rose significantly over earlier levels. Nevertheless, the growth rate of real GDP per capita was identical in the two periods (Gale 2002). In formal tests, Stokey and Rebelo (1995) find no evidence of a break in growth patterns around World War II. Obviously, many factors affect economic growth rates, but if taxes were as crucial to growth as is sometimes claimed, the large and permanent historical increases in tax burdens and marginal tax rates might be expected to appear in the aggregate growth statistics. For example, if the average marginal tax rate was 25 percent in the postwar period and zero in the pre-World-War-I period, applying the Engen-Skinner results noted above would suggest the

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Flaschetti and Orlando (2003) and Rubinger (2004) for analyses of how the new treatment of dividends could adversely affect corporate governance and create new tax shelters, respectively.

[14]The Council of Economic Advisers (2003, p. 204) suggested that under the administration's original dividend proposal, the improved efficiency would generate gains equal to between .08 percent and 0.5 percent of GDP (Economic Report of the President 2003, p. 204).

real per capita annual growth rate should have been lower by 1.0-1.5 percentage points in the post-war period. This difference is large, especially relative to the 2.2 percent per annum real growth in per capita GDP that occurred in both periods.

Empirical studies of the growth effects of actual U.S. tax cuts are relatively rare, in part because the United States had only one major tax cut between 1965 and 2000. Feldstein (1986) and Feldstein and Elmendorf (1989) find that the 1981 tax cuts had virtually no net impact on economic growth. That may be surprising, given the incentives created by the large marginal rate cuts in the 1981 tax cut. But the tax cuts also entailed significant income effects, and the act increased tax-sheltering activities and the budget deficit, all of which militates toward negative effects on growth.

Cross-country studies find very small long-term effects of taxes on growth among developed countries.[15] Mendoza et al. (1997) and Garrison and Lee (1992) find no tax effects on growth in developed countries. Padovano and Galli (2001) find that a 10 percentage point reduction in marginal tax rates raises the growth rate by 0.11 percentage points in OECD countries.[16] Engen and Skinner (1992) find significant effects of taxes on growth in a sample of 107 countries, but the tax effects are small and insignificant when estimated on developed countries.[17]

Simulation models offer a third approach to examining tax cuts. A simple extrapolation based on earlier published results from the Federal Reserve Board model of the U.S. economy implies that a cut in income tax rates that reduces revenues by 1 percent of GDP will raise GDP by 0.1 percent after 10 years (Reifschneider et al. 1999) if the Fed follows a Taylor (1993) rule for monetary policy.

Another source of evidence is simply asking economists what they think. In a recent survey of 134 public finance and labor economists, the estimated median effect of the Tax Reform Act of 1986 on the long-term size of the economy was 1 percent (Fuchs et al. 1998). Note that TRA 86 cut marginal tax rates by more than EGTRRA and JGTRRA, particularly at the top, and did not involve an increase in the deficit. For both of these reasons, the long-term growth effects of TRA 86 should be larger than that of EGTRRA and JGTRRA.

A final approach considers simulations of the growth effects of fundamental tax reform. Altig et al. (2001) develop the most complete model of tax reform and find that a flat tax with transition relief would raise national income by 0.5 percent after 15 years. Without transition relief, the flat tax would impose a one-time wealth tax, and the economy would grow by 2.2 percent over 15 years. That comparison suggests that most of the growth effects of consumption taxes are due to one-time wealth effects that might be imposed rather than the much-publicized changes in economic incentives at the margin.[18] That has two implications for interpreting the recent tax cuts. First, the effects of the much smaller effective marginal tax rate reductions involved in the 2001 and 2003 legislation would be much less significant. Second, the dividend and capital gains tax cuts in the 2003 legislation subsidize old investment rather than imposing a one-time tax on it. The subsidy to old investment will reduce any positive effects on growth.

VII. Conclusion

Previous articles in this series noted that making the 2001 and 2003 tax cuts permanent would be regressive and would significantly exacerbate the budget situation (Gale and Orszag 2004b, c). Those budgetary and distributional effects might be worth enduring if making the tax cuts permanent stimulated significant economic growth. Yet every study to date suggests the opposite conclusion — the tax cuts will do little if anything to stimulate growth, and would likely reduce future national income, unless they are financed entirely by spending cuts. The explosion in federal spending since the tax cuts have been enacted belies the likelihood of that outcome.

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[15]*See* Slemrod (1995) for a critique of the literature. Blanchard and Perotti (1999) provide additional evidence but focus on short-term effects.

[16]Folster and Henrekson (2001) find no tax effects on growth in OECD countries. When they extend the sample to include high-income, non-OECD countries, they find a significant effect. But the regressions using tax variables do not control for spending, so it is not clear what the tax variable is capturing.

[17]Engen and Skinner (1992, table 4, column 4). Statistical insignificance might be attributed to the fact that there are only 21 developed countries, but several of the other variables — including investment rates, initial income, labor force growth, and government spending growth — continue to be estimated precisely in the sample of developed countries.

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[18]*See also* Auerbach (1996), Joint Committee on Taxation (1997), and Judd (2001).

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