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**Taxes and Business Investment:  
Lessons from the Past Decade**

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## 1. Introduction

When President Bush took office in January 2001, the economics literature on the impact of fiscal policy on investment had experienced a recent resurgence in activity and results. As the 1990s began, the conventional wisdom based on a large literature that utilized time series data was that tax policy has little or no effect on business fixed investment while other models, such as the traditional accelerator or the financial accelerator were much more useful.<sup>1</sup> But by the end of that decade, a large literature drawing on panel data and natural experiments had converged to a view that tax policy could indeed influence investment significantly. At the same time, the results based on models that appealed to accelerator effects or financial frictions became more hotly disputed.<sup>2</sup>

The literature documenting tax effects generally employed versions of the standard Hall-Jorgenson user cost model, which maps changes in investment tax credits, statutory tax rates, and depreciation rules to a user cost measure of the marginal incentive to invest (see, Hassett and Newmark 2008). As such, the literature provided an ambitious policy entrepreneur with something of a detailed road map to an economic model. A canonical model existed with well specified and easy to adjust policy parameters. These tax variables fed into a user cost formula that had a fairly precisely established link to investment.

Whether this evidence that tax policy could influence investment played a role or not, U.S. investment policy began to change. With the heightened motivation provided

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<sup>1</sup> See, for example, Clark (1979) and Bernanke, Bohn and Reiss (1988).

by a recession that the NBER dated to have begun in March, 2001 combined with a sharp drop in business fixed investment, Congress passed legislation introducing “bonus depreciation” for qualifying investment, generally investment with a depreciation lifetimes no greater than 20 years. Under the provisions of the 2002 legislation, investment occurring during a three-year period starting on September 11, 2001, 30 percent of investment expenditures could be written off immediately, rather than according to regular depreciation schedules. The following year, this bonus depreciation or “partial expensing” increased to 50 percent of each qualifying purchase, and extended to cover investment through the end of 2004. Although there were some attempts to extend bonus depreciation even longer, the 2003 changes to the program were the last during that time period and the provisions expired at the end of 2004.

This partial expensing was the first major change to investment policy in the United States in 16 years. In addition, this policy was accompanied in 2003 by a reduction in the maximum tax rates on dividends and capital gains to 15 percent from the previous rates of 20 percent for capital gains and 35 percent for dividends received by taxpayers in the highest tax bracket. While dividend tax rates have change in the past, previous changes, such as those included in the Tax Reform Act of 1986, were associated with other changes in tax rates on individual investors, which would have affected investment through other channels as well. The 2003 change in dividend taxation is thus unique in providing an opportunity to isolate the effects of changes in the taxation of dividends.

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<sup>2</sup> See, for example, Hassett and Hubbard (2002), Kaplan and Zingales (2000), Whited (2007), Cummins, Hassett, and Oliner (2006).

Combined, these two policies provided economic researchers with important challenges and significant research opportunities. A new literature has subsequently exploded. The purpose of this paper is to review the findings of that new literature.

Scholarship proceeded in two main thrusts. First, before data were available to allow researchers to study the impact of the new policies, several theoretical papers were written that explored the theoretical impact of these changes. Implicit in this analysis was the maintained hypothesis that the calculation of the user cost impact of a given set of policies was a valuable addition to our understanding of the likely impact of these policies because the link between the user cost and investment was so well understood.

In the second wave of scholarship, and in the dividend area in particular the wave could be classified as of the tidal variety, economists have explored the actual empirical effects of these policies.

For perspective on these matters, Figure 1 details the tax changes that are the focus of this paper. Thirty percent partial expensing first passed the house on October 10, 2001, but did not formally become law (albeit retroactively to September 11, 2001) until March 9, 2002. On Christmas day of 2002, the *New York Times* reported that the President Bush would seek to lower the dividend tax in 2003. On May 28, 2003 the maximum tax on dividends and capital gains was lowered to 15 percent and partial expensing was increased to 50 percent. The partial expensing expired on the last day of 2004.

For reference, the chart also includes data for Manufacturers Orders of Nondefense Capital Goods Excluding Aircraft over the same period. The aggregate data confirm that partial expensing was introduced after an enormous decline in investment

activity and that the steady increase of aggregate investment continued until partial expensing was repealed at the end of 2004. This is, of course, only suggestive of a possible influence of tax policy, as many other factors changed as well over this time period.

In this review, we proceed in two steps. First we explore the impact of partial expensing, beginning first with the theoretical work and moving on to the empirical work. Second we discuss the new literature on the impact of the dividend tax reductions, and proceed in the same fashion. In our final section, we discuss the many open questions that remain.

## **II. Partial Expensing**

JCWAA, the Job Creation and Worker Assistance Act, was enacted in March 2002. The law provided a temporary increase in depreciation allowances in the form of 30 percent partial expensing provision for business spending on equipment and software. This temporary increase took a form that fit easily into the user cost framework, and thus, the theoretical challenge of identifying the likely *ex ante* effect of this policy depended primarily on particular assumptions and parameters within this framework.

Cohen, Hansen, and Hassett (2002) undertook the task of quantifying the likely impact of the policy. They found that there were a number of factors that influenced conclusions regarding the theoretical effect of this policy. The first was expectations concerning the policy's expiration. If the policy were expected to be permanent, then its impact on investment, they found, would likely be small. This was because previous law already allowed firms to accelerate depreciation, and since inflation and nominal discount rates were relatively low when the law was changed, the effects of the 30 percent

expensing were minor. For example, for 7 year equipment, the effect on the user cost under their baseline assumptions would be a proportional reduction of only 2.5 percent.

Cohen *et al.* also showed that the effect on investment might have been greater if firms expected the measure to expire. This is because of the strong incentive to pull investment forward from next year if the bonus is only available this year. In that case, the user cost reduction associated with the policy was about 15 percent relative to the old law. In 2003, JGTRRA increased the bonus depreciation to 50 percent and extended its applicability by a few months. This extension raised the predicted user cost impact from the baseline case discussed in Cohen *et al.* approximately proportionally, although it would have had offsetting effects in 2002 had it been anticipated then.

The second factor that influenced the calculated effect on the incentive to invest was the extent to which firms faced significant adjustment costs. In the simple Hall-Jorgenson model with no adjustment costs, investment would depend simply on this year's tax parameters (including the expected change in investment incentives from this year to the next). But as in Auerbach (1989) showed, in a model with adjustment costs, current investment would not only be more sluggish to respond to changes in incentives, but also would depend on both current tax policy and expected future tax policy. When adjustment costs are significant, then the current user cost effect would be predicted to be relatively insignificant, as the future period wherein the policy is expired has an important impact on the target capital stock, and acts as an anchor weighing down the possible impact of the policy.

A third concern was raised by Edge and Rudd (2005), who explore the impact of temporary partial expensing in a general equilibrium model. They find that general

equilibrium effects can lead to reversals of the ranking of partial equilibrium results. For example, they find that a temporary policy can have a smaller effect than a permanent one depending on the endogeneity of saving.

Thus, whether the policy of bonus depreciation should have been expected to be effective at achieving its objective of stimulating investment depended on factors that were not fully known at the time of the policy. It is highly uncertain that investors would have expected the policy to expire, as there were, at the time, many rumblings from congressional Republicans that the proper policy would be to move to full expensing, and one might reasonably expected that there was some chance that these rumblings could turn into action. Also, there remains a great deal of uncertainty in the literature regarding the exact nature and significance of adjustment costs.<sup>3</sup> Ultimately, then, it was necessary to turn to empirical work to establish the impact of the policy, not simply to test the predictions of the model, but also to draw inferences as to these unknown factors.

In their research on the effects of bonus depreciation, House and Shapiro (2006b) take a different approach. They assume that firms expected the expiration of the partial expensing provision and explore the implications of this assumption for investment and asset prices before the expiration occurred. They find that investment increased the most for equipment with a longer recovery period, and that “bonus depreciation had a powerful effect on the composition of investment....In spite of the sizeable effects on investment, the policy had only modest effects on aggregate employment and output” (35).

As part of their investigation, House and Shapiro study the impact that temporarily higher investment demand should have on capital goods prices. Goolsbee

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<sup>3</sup> See for example Barneq and Sakellaris (1998) and Abel and Eberly (1999)

(1998) argues that investment subsidies drive up the price of capital goods because they are inelastically supplied. House and Shapiro show that theoretically, in a closed economy, the price of capital goods should fully reflect the tax subsidy irrespective of the elasticity of supply, for a very short-lived temporary provision. They find, however, that this effect is not visible in the data; indeed, capital goods prices barely budged while demand was surging because of the credits.

In light of the theory, it is not clear how one reconciles these results regarding a large investment response and a small price effect. One possibility is the presence of other factors influencing investment. House and Shapiro (2006a) explore the impact of the phased-in personal income tax cuts that were originally scheduled to be phased in between 2001 and 2006, but were ultimately made law immediately in 2003. They identify a likely large growth effect beginning in the second half of 2003, an effect which might help explain investment responses that were larger than the traditional models might have predicted.

To date, there are few other papers exploring the same ground as House and Shapiro. Desai and Goolsbee (2004), which will be discussed in more detail in the next section, perform an analysis of Compustat data and conclude that partial expensing provided little stimulus to investment. This conclusion is, however, not based on analysis of the investment response by firms after the tax changes were enacted, but is an inference based on their results and a user cost analysis. They assert that the user cost effect of the expensing provisions was small, based on the assumption that firms were surprised by its expiration. But given the parameter estimates from their investment equation, if firms knew that the tax cut would expire, then the effects would be much

larger; indeed, their model predicts almost a 20 percent increase in equipment investment in the expiration year under the most aggressive assumptions. Since their sample period was almost exclusively before the changes, they essentially offer little new empirical evidence regarding the impact of the policy.

Cohen and Cummins (2006) explore the impact of partial expensing drawing on monthly capital goods shipments data collected and compiled by the Bureau of the Census. They note in the introduction to their paper that the macroeconomic evidence suggests that the policy could have had a significant effect on investment. In particular, NIPA expenditures in equipment and software excluding high tech equipment and transportation goods saw its growth rate increase from 2 percent in 2002 to 6 percent in 2003 to 11 percent in 2004, dropping to only 2 percent at the beginning of 2005. However, the data below the surface were less consistent with the predictions of the model. In particular, the user cost reduction associated with the tax change was larger for long-lived equipment than for short-lived equipment. Accordingly, strong confirmation of the model's predictions would have occurred if the aggregate number increased more for long-lived equipment than it did for short lived equipment. They perform a difference-in-difference analysis and conclude that the opposite occurred, a pattern that is not consistent with the predictions of the theory.

Cohen and Cummins also provide other evidence that is consistent with the view that the policy had minor effects. First, they cite a Treasury study that found that there were only minor changes in the "take-up rate" in 2003, that is, the fraction of eligible investment dollars that was claimed for the purposes of receiving bonus depreciation. According to that data, about a third of relevant investment was undertaken by firms that

were not taxable, and hence, could not benefit from the measure, and second, among firms that did claim bonus depreciation, only about two-thirds of investment qualified. Thus, applying these fractions to an already small user cost effect, Cohen and Cummins conclude that their failure to find a large effect is understandable.

Cohen and Cummins also cite a survey undertaken by the Institute for Supply Management. According to that survey, nearly two-thirds of respondents indicated that the partial expensing had no effect on the timing of their capital spending.

Auerbach, Chaney, and Hassett (2008) use Compustat data to explore whether the partial expensing measure created shifts in investment consistent with the predictions of the user cost model. Following Auerbach and Hassett (1991), and Cummins, Hassett, and Hubbard (1994), they explore the cross-section relationship between investment and the user cost of capital, in particular whether the “surprises” – components unpredictable based on past information – in investment in the years in which the policy changed were larger for assets that had the bigger “surprises” in user cost, with the cross-section variation coming from differences in capital stock composition among firms. They found evidence that the two sets of surprises were related, and obtain point estimates of the response that were quite similar to those in the earlier studies.

Summing up, there is evidence that investment surged prior to the expiration of the partial expensing provision, and after it as well. There is not enough evidence that the pattern of investment across assets differed from the predictions of the model to cast serious doubt on the *a priori* view that the partial expensing provision would have a small and positive effect on investment.

### **III. Dividend Taxes**

Unlike the case of partial expensing, the original Bush proposal to reduce the dividend tax was not as easily characterized in terms of predictions based on the canonical user cost model. The President's plan allowed shareholders to receive a dividend tax free only if the corporation paying the dividend had already exposed the income to taxation. If the corporate income has been "sheltered" from tax then the distribution would have been subject to personal income tax. Because of this provision, the incentive effects of lower dividend taxes were potentially muted, depending on the firm's tax status. Accordingly, alternative plans that provide for a smaller tax rate reduction at the individual level that was smaller but not dependent on the firm's tax status could have incentive effects similar to the President's proposal.

This led the authors to have an unusual role in the legislative process. Early in January of 2003, one of us (Hassett) was invited to the House Ways and Means Committee to explain the economic effects of the Bush proposal to staff. During the meeting, the special condition attached to the zero tax on dividends that bound the lower rate to an "EDA" or Earned Dividend Account was discussed, and it became apparent that the effects of the Bush proposal could not be characterized using the standard model. Accordingly, we proceeded to develop a revised model that included the EDA, and wrote up notes that explored the impact of the EDA on user cost calculations.

Our analysis revealed that the impact of the proposal depended on several factors. In particular, that the limitations imposed by the EDA could significantly undermine the marginal impact of the Bush proposal. As an illustration, consider a simple example. Suppose that a company has \$110 in income and has a deduction (perhaps for

depreciation) that is worth \$10. If the company claims the \$10 deduction then it has \$100 in taxable income, and pays a corporate tax of \$35. If the company then pays the left over \$65 as a dividend to its shareholder, then the shareholder pays no additional tax. Suppose that the firm also decides to distribute the \$10 it has in cash that was sheltered. At that point, the shareholder will have to pay tax on the income, since it never faced the first level of taxation at the corporate level. Suppose the shareholder has a tax rate of 35 percent. In that case, when he receives the \$10, he will have to pay \$3.50 tax, leaving him with \$6.50 after tax. His total after-tax benefit from both dividends is  $\$65 + \$6.50 = \$71.50$ . Notice that this is the same after-tax income he would have received if the company had not claimed the deduction. In that case, the company would have paid 35 percent tax on \$110 (\$38.50), but then it could distribute the left over \$71.50 tax free. Thus, there is no tax benefit for the incremental dividend; put another way, the deduction has completely lost its economic value.<sup>4</sup> Its only effect is to move \$3.50 tax from the corporate level to the individual level.

Our analysis of the incentive effects of the Bush proposal, based on estimates of the impacts on different types of firms, suggested that a simplified proposal that scratched the EDA could have a similar marginal effect with a much smaller rate reduction, to about 15 percent. Interestingly, this rate reduction without the EDA was scored by the Joint Committee of Taxation to cost significantly less than the Bush proposal as well, perhaps because of differences in timing of tax collections, interpretation of provisions or differences between marginal and average effects. In meetings, Ways and Means Chairman Thomas seized on this observation to hatch a legislative strategy that involved

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<sup>4</sup> Even in this case, there might be some net tax benefit associated with reductions in future capital gains taxes, but this benefit would likely have been small.

“compromising” with dividend tax skeptics by reducing the rate less but scratching the EDA.<sup>5</sup>

The dividend tax reduction, as passed, is simpler to analyze, but this analysis still hinges on a critical assumption regarding the source of marginal equity finance. Under the “traditional” view, a firm’s marginal source of funds is new equity issues. Under this view, investment is responsive to dividend taxes. According to the “new” view, however, a firm’s marginal source of funds is retained earnings. Firms issue new equity only once retained earnings are exhausted and thus the investment levels of mature firms not dependent on the new equity market are unresponsive to changes in dividend taxes. Under the new view, time invariant dividend taxes are capitalized into the value of the firm but do not affect investment.

Prior to the dividend tax proposal, research on this topic provided mixed evidence on the relative importance of the two views, with the latest evidence suggesting that firm level heterogeneity is important, and that some firms should be thought of as “new view” firms while others were better described by the “old view”.

One paper at the time established the *ex ante* prediction of the user cost model, Carroll, Hassett, and Mackie (2003). They estimated that under the traditional view, the tax changes reduced the marginal effective total tax rate by about 4 percentage points under their baseline assumptions, from 33.5 percent to 29.4 percent. Under the new view (and also accounting for the capital gains tax changes, which affect the user cost under both views), the reduction in the user cost was smaller, from 29.6 percent to 27.7 percent.

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<sup>5</sup> Chairman Thomas subsequently arranged for one of us (Hassett) to present these results to a session of House Republicans at the Greenbrier, perhaps with the intent of garnering support for his compromise.

In earlier work, relying on a sample that predates the dividend change, Auerbach and Hassett (2003) examined investment financing directly to determine the relevance of the different views and found considerable heterogeneity in their sample of firms, with capital market access an important factor in determining a firm's likelihood of issuing new shares. Under the new view, the dividend is a residual and, they showed, should be negatively correlated with investment and positively correlated with cash flow once one controls for Tobin's  $Q$ . They utilized this observation to test the validity of the two views and showed that the responsiveness of dividends to cash flow and investment varies significantly across publicly traded U.S. firms. They concluded that about half of firms that had paid dividends, and hence for whom the new view could potentially apply, seem to have dividend payout behavior consistent with the new view, while half appear to behave more consistently with the traditional view. This suggested at the time that perhaps half of this subset of firms would have relatively large investment responses to the change because they were governed by the old view, whereas the other half would have a relatively small response. Desai and Goolsbee (2004) also found support for the new view, by looking at the effect of the dividend tax cuts on investment. In their analysis of the 2003 dividend tax cuts, Desai and Goolsbee take a novel approach by using firm-level investment data to distinguish between the traditional and new views of dividend taxation. They reestimated a variation of the Poterba and Summers (1985) model, and found strong confirmation that the new view best describes the data.<sup>6</sup>

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<sup>6</sup> Other studies have also implied that there are significantly more new view firms than might have been suggested by Poterba and Summers. Gentry, Kemsley, and Meyer (2003) exploit the unique tax characteristics of Real Estate Investment Trusts and find that dividend taxes are capitalized into share prices, lending support to the new view. Sialm (2005) uses time-series data from 1917 to 2004 and also finds evidence of tax capitalization.

As was the case with partial expensing, this user cost effect could have been expected, based on the investment literature, to have a modest positive effect on investment. In this case, however, the change also could be expected to influence the marginal incentive to pay a dividend, and, accordingly, a large literature has emerged to explore this implication. That literature is a rich one, and has shed significant new light on a number of key issues in corporate finance.

### ***III.A The Investment Effect of Dividend Tax Changes***

Indirect evidence concerning the likely impact of the dividend change on the user cost of capital is available in Auerbach and Hassett (2005), who examined the dividend response debate directly with an event study of the stock price response to news about the probability of dividend tax changes. They found that firms with higher dividend yields benefited more than other dividend-paying firms, which could support either the new or the traditional view, depending on whether firms believed the tax cut was temporary. Additional evidence contradicting the traditional view came from the fact that non-dividend-paying firms and firms likely to issue new shares received a larger boost than other firms. Under the traditional view, such firms should not have experienced a larger reduction in the cost of capital, which would be related to the firm's dividend payout rate, a variable already controlled for in the regressions.

Why was such a pattern observed? A tax cut increases the future after-tax value of dividends, which increases the value of the firm today if it is expected that the firm will pay dividends in the future and that the tax cut will last into the future. Furthermore, if a firm is expected to issue new shares in the future, the present value of any future dividends is greater and thus so is the increase in the value of the firm today.

Auerbach and Hassett also explored whether similar effects could be observed during the 2004 presidential race. In 2004, Senator Kerry vowed that he would let the dividend tax cut expire, whereas President Bush was committed to its extension. Accordingly, one might expect that the market would correlate the probability of a Kerry victory with the probability of a more temporary dividend tax reduction. The authors explored whether results consistent with the event study were also observable during the election by relating stock market performance to presidential futures. They found results that confirmed the earlier event-study results, but also shed additional light on the dividend tax mechanism. In particular, under the new view, firms with high dividend yields should have outperformed other firms when the probability of repeal increased, because they will disgorge a higher percentage of their dividends in the low tax years. Under the traditional view, the lower dividend tax should reduce the cost of capital disproportionately for high dividend firms, giving them a value bonus that should increase with the permanence of the dividend tax cuts. The presidential futures results suggest that the bonus to paying high dividends *declined* when the dividend taxes were more likely to be permanently low (that is, when the probability of Kerry being elected declined), consistent with the new view.

Amromin, Harrison, and Sharpe (2005) interpreted these results differently, arguing that the evidence supports the view that dividend taxes are irrelevant. In particular, they argued that share prices for non-dividend-paying firms and for those likely to issue new shares outperformed over the entire period, not just during the event days analyzed by Auerbach and Hassett. In addition, Amromin et al. argue that the U.S. stock market did not outperform foreign markets during that period.

Auerbach and Hassett (2006) extended their earlier work and also responded to Amromin et al. Their extension involved an analysis of options data around the 2004 election. When President Bush was elected, it likely conveyed a significant amount of information about the probability that dividend taxes would remain low in the future. Prior to the election, uncertainty about the outcome should have led to a high level of volatility, especially for the firms that should have been most influenced by dividend taxes. This would, the authors argued, be visible in options prices, which are especially sensitive to volatility. Consistent with this theory, they found that President Bush's re-election, and thus the resolution of some of the uncertainty that the tax cuts would be extended, caused a greater decline in volatility for the firms most affected by dividend taxes in their earlier study.

In addition, Auerbach and Hassett noted that the standard errors for the aggregate runs reported in the Amromin et al. study were so large that they would be unable to detect the full theoretical effect of the dividend tax reductions even under the most optimistic assumptions of the tax cut's impact, and even assuming that the entire effect occurred in one day.

In the only study to date that has directly estimated the impact on investment of the dividend tax changes, Auerbach, Chaney, and Hassett (2008) divided their user cost regressions according to sample splits that were based on Auerbach and Hassett's (2005) classification of firms. As mentioned previously, the authors found that the user cost effect of partial expensing was significant. When investigating dividend tax policy, the authors found that the user cost effect was biggest for immature firms, that is, firms that had never paid a dividend, that saw the largest market capitalization response to the

dividend changes. This suggests that the dividend tax cut may have stimulated investment significantly through this channel. However, the authors also found that firms that were not taxable in this period had little response to the user cost. As there were many such firms, this suggests that the aggregate effect of the dividend tax cut on investment was smaller than one would have predicted if one ignored the fact that many firms left the recession with a healthy tax loss carry-forward position. This observation is magnified by Altshuler, Auerbach, Cooper and Knittel's (2008) result documenting a dramatic increase in the proportion of firms that had tax losses during this time period.

Thus, the literature is somewhat mixed on this issue. The data seem to favor the new view of the user cost effect, which suggests that the impact of the dividend tax change would be small for most mature firms. However, there is evidence that immature firms responded quite a bit. On balance, then, one should conclude that as was the case with earlier studies of the new and old views, firm heterogeneity seems to be quite important in evaluating the investment response to the dividend tax reduction.

Consistent with the view that there may have been a significant if not enormous effect of the dividend tax cut is a recent paper by Gilchrist and Zakrajsek (2007). They use bond price data to calculate firm-specific interest rates and user costs assuming the marginal source of finance is debt. They find that a 1 percentage point increase in the user cost of capital implies a reduction in the investment rate of 50 to 75 basis points, a number which rises to a 1 percent reduction in the long run. As their data stretch through the period in question in this section, they, thus, establish that a user cost elasticity consistent with that observed in earlier episodes is apparent during this period. As the user cost changed to some degree under every view of the marginal source of finance,

this lends credence to the view that there was some investment response to policy during this time period.

### ***III.B Dividend Payout Changes***

A large literature has emerged that has studied the impact of the dividend change on firm financial policy. That literature was anticipated by Poterba (2004), who prospectively calculated that JGTRRA would gradually increase the long-run level of dividends by 31 percent or \$111 billion, a result that is consistent with the traditional view of dividend taxation. A similar increase under the new view might also be possible if the tax reduction is considered by firms to be temporary, as firms would choose to disgorge dividends during the low tax period.

Chetty and Saez (2005) document that after declining for over twenty years, the fraction of firms paying dividends began to increase after the 2003 tax change. The tax cut also encouraged dividend-paying firms to increase their payments, and as a result of these changes, total regular dividend payouts increased by 20 percent within six quarters. They estimate an elasticity of regular dividend payments with respect to the marginal tax rate on dividend income of -0.5, a finding that is robust to controls for a variety of firm characteristics. In contrast, Julio and Ikenberry (2004) find that the increase in dividend-paying firms began in late 2000, but Chetty and Saez (2005) argue that once changes in sample composition are controlled for, the increase did begin in 2003. Chetty and Saez find that the increase in dividends was largest in firms that had strong principals whose tax incentives changed (those with taxable institutional owners, for example), and in firms whose executives owned many shares. They conclude that principal-agent issues play an important role in dividend payout decisions, an issue touched on further below.

This observation is consistent with other work in a large emerging finance literature. Dahlquist, Robertsson and Rydqvist (2006) document that significant tax clienteles exist, with low tax investors tending to weigh high dividend paying firms more highly in their portfolios, while high tax investors move in the opposite direction. The results are quite striking, with tax neutral investors earning fully a 50 basis point higher dividend yield on average than taxable investors. Similarly, Hotchkiss and Lawrence (2007) find that fund managers tend to increase portfolio weights for firms that increase their dividends when their primary shareholders are not taxable, and reduce portfolio weights when shareholders are taxable.

Blouin, Raedy, and Shackelford (2004) find, for a small sample of firms, a statistically significant increase in both regular and special dividend payments following the tax cut. They argue, however, that the tax cut may not be causal. The economy was also improving at this time and investors were increasingly evaluating firms based on dividends, not earnings. Furthermore, they find that greater ownership by individuals, the beneficiaries of the tax cut, did not make a company more likely to increase dividends.

Brown, Liang, and Weisbenner (2004) argue that the increase in dividend payouts may have failed to increase total cash flows from firms to shareholders. They show that for many firms, share repurchases tended to decline at the same time. Chetty and Saez (2006) take issue with this interpretation, arguing that Brown et al.'s comparison of pre- and post-reform dividend-paying firms is prone to selection bias. The pre-reform firms are an endogenously-selected group that chose to pay dividends even before the tax change. Comparing the repurchasing behavior of the two groups of firms is further problematic because there is an upward trend in share repurchases among all firms over

time. Controlling for the time trend, Chetty and Saez find that firms that initiated dividends after the tax change were actually less likely to have repurchased shares in the previous year, thus reversing the Brown et al. finding. They conclude that further research on share repurchases is necessary to determine the effect of the tax cuts on total payouts to shareholders following the dividend tax cut. Perhaps in response, Blouin, Raedy and Shackelford (2007) investigate whether share repurchases were reduced as firms increased dividends. They find that they did, and that the effect was markedly higher for firms that had a higher percentage of individual (and presumably taxable) shareholders.

Desai and Dharmapala (2007) find another interesting portfolio effect of the change. A little known feature of the dividend tax change is that it applied to dividends from firms headquartered in countries that have a tax treaty with the U.S. If a U.S. portfolio investor owned shares of a firm from a tax treaty country, then the low dividend tax rate applied to the dividends received. Dividends from firms domiciled in a country without a tax treaty with the United States would be subject to the older and higher rate. Desai and Dharmapala find that this less well known provision had a large and significant effect on portfolios, with U.S. holding of lightly taxed assets increasing significantly, with an implied tax elasticity larger than unity.

There is also a rich literature exploring the response of share prices on ex dividend day, and the dividend tax reduction provided researchers with an opportunity to shed new light on the results in this literature. The stylized fact in this literature is that the price of a firm drops by less than \$1 when a dollar of dividend is paid. One explanation for this is that the dividend tax has generally exceeded the capital gains tax

for taxable investors, so that the net after-tax cost of foregoing a dollar of dividends is less than 1. But others have challenged this position. For example, Michaely (1991) found no significant change in the ex dividend day premium to have resulted from the Tax Reform Act of 1986, which eliminated the dividend-capital gains tax rate differential. For the 2003 tax change, which again eliminated this differential, Zhang, Farrell, and Brown (2008) find an increase in the ex dividend day share price drop, consistent with the tax rate change. Chetty, Rosenberg and Saez (2007) find this result as well, but when looking over a longer period of time, they question the robustness of their finding, showing that there were periods of important tax changes (such as 1986) when the ex dividend day premium did not respond as predicted and other periods without important tax changes when the ex dividend day premium changed considerably. Chetty et al. also look at the impact of tax reforms on the excess stock returns on dividend *announcement* dates. According to the signaling theory of dividends, which provides one explanation for why dividends are paid, an increase in the tax cost of paying dividends should increase their signaling value and hence raise the market response per dollar of announced dividends. Bernheim and Wanz (1995) confirmed this result for the Tax Reform Act of 1986 but, as with their results with respect to ex dividend day price movements, Chetty et al. show that this finding is not stable over time.

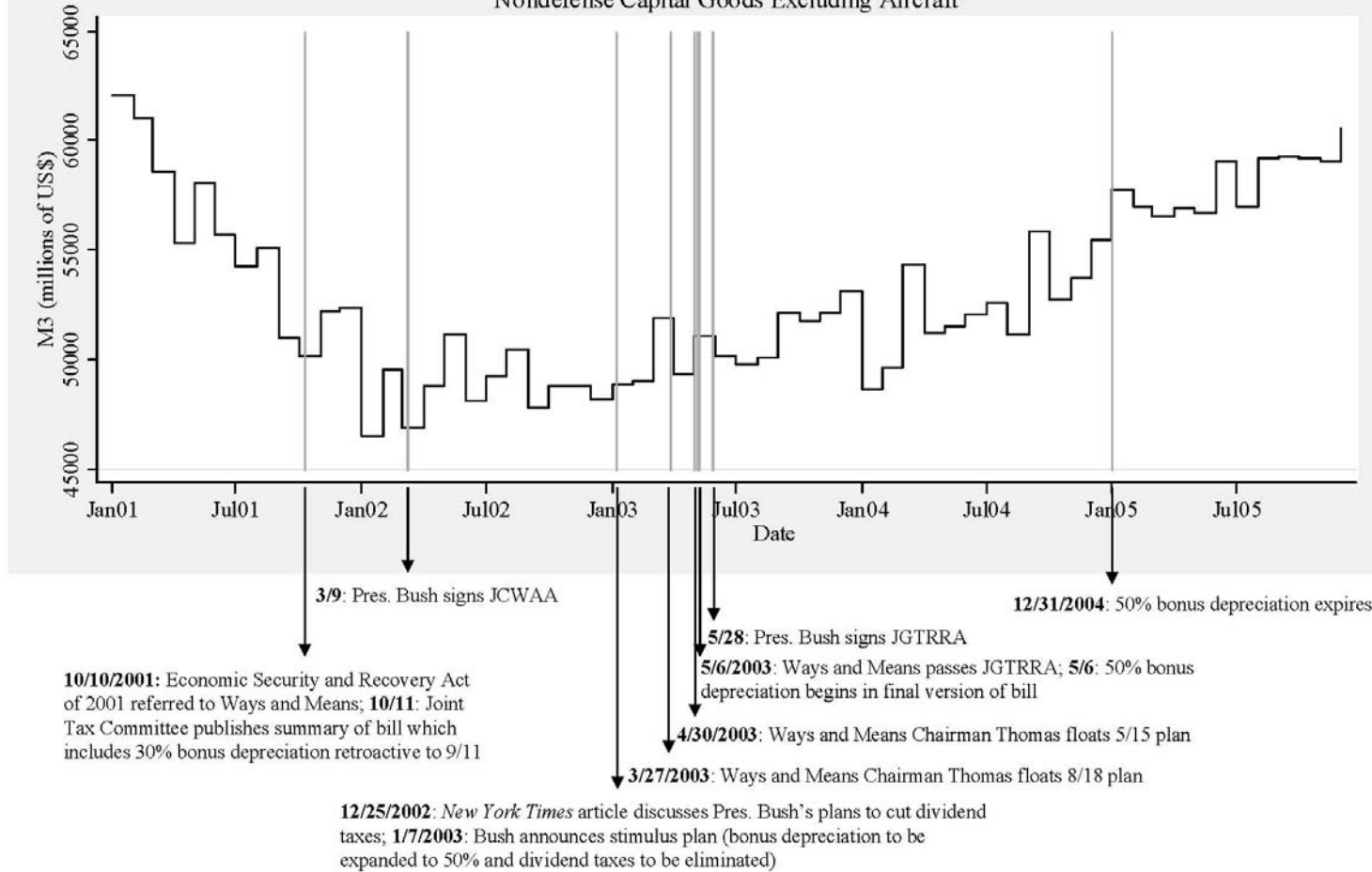
To sum up, the dividend tax reduction led to a surge in share prices for firms that was a function of their dividend paying and share issuance behavior, and also to an increase in dividend payouts. The underlying pattern of the former change favors the new view, suggesting that the capital spending effects of the tax cut may be small, unless a surge in investment occurred for immature firms. The surge in dividend payouts would

favor the traditional view if the dividend tax reduction were expected to be permanent by dividend-paying firms. If the tax reduction were expected to be temporary, new view firms would also be expected to accelerate their dividends. While other evidence (as from the portfolio responses in the holdings of foreign shares) points to the impact of the 2003 tax changes, investigation of ex dividend day and announcement day price movements has revealed some limitations to what we can learn from the 2003 experience. The fact that the dividend responses to the 2003 tax changes depended on the tax status of principals and important shareholders raises the question of agency problems in the determination of firm behavior, and has led to some recent theoretical attempts (e.g., Chetty and Saez 2007, Gordon and Dietz 2006) to move beyond existing views of how taxes affect dividend policy to consider the impact of agency theory, with the potential to reveal important implications for the welfare implications of dividend tax rate changes.

#### **IV. Conclusion**

The recently enacted tax changes regarding dividends and expensing have been studied to a varying degree. There is strong evidence that the dividend tax changes had an impact on payout behavior, and weaker evidence that this had an impact on investment. The data in hand are consistent with the view that the partial expensing measure led to a surge in investment. The partial expensing has been studied much less than the dividend tax reduction, and, accordingly, there appears to be ample room for new evidence in that area.

Figure 1: Manufacturers' New Orders  
Nondefense Capital Goods Excluding Aircraft



Source: Manufacturer's Shipments, Inventories, and Orders (M3) Survey

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