

Effective Tax Rate Changes and Earnings Stripping Following Corporate Inversion

Abstract - We examine the financial and valuation consequences of corporate inversion using a sample of 12 inversion firms and 24 matched firms. We find that firms' effective tax rates (ETRs) decline substantially following inversion. Based on pre- to post-inversion changes in foreign profit margin, U.S. profit margin, and the geographic composition of pre-tax income, we infer that inversion-related ETR reductions are due to U.S. earnings stripping. For four firms, we provide evidence that intercompany debt is the mechanism used to strip earnings. Finally, we find that abnormal returns at shareholder approval dates are associated with inverted firms' realized ETR changes.

INTRODUCTION

In a typical corporate inversion, a U.S.-domiciled parent corporation forms a new subsidiary in a tax haven country, and the haven-domiciled entity becomes the parent company of the firm's U.S. and foreign operations. Executives of inverting firms typically state that inversion will reduce the financial statement effective tax rate (ETR) and improve earnings and cash flows.¹ While acknowledging the legality of inversion transactions, policymakers have questioned their ethics and patriotism. Senator Charles E. Grassley describes inversion as "immoral," and states that "during a war on terrorism, coming out of a recession, everyone ought to be pulling together. If companies don't have their hearts in America, they ought to get out" (Hamilton, 2002). However, an Ernst & Young promotional video asserts that "just the improvement on earnings is powerful enough to say that maybe the patriotism issue needs to take a back seat to that" (Hamilton, 2002). Managers suggest that the source of inversion-related tax savings will be the reduction or elimination of U.S. tax on *foreign-source* earnings. For example, at a May 14, 2002 special meeting of shareholders, Cooper Industries' CEO H. John Riley, Jr. stated:

Unlike our major trading partners, the United States taxes a business based on place of incorporation rather than source

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¹ For example, in a November 2, 2001 letter to shareholders, Ingersoll-Rand CEO Herbert L. Henkel stated that inverting "should help enhance our business growth and cash flow and reduce our worldwide effective tax rate."

of the income. As a result, U.S. corporations are at a disadvantage when competing with foreign-based competitors... . While a foreign-based company would enjoy a 10% rate in Ireland, a U.S. company like Cooper is required to pay both the 10% tax rate in Ireland and, ultimately, an additional 25% tax to the United States. I'd say that's a clear competitive disadvantage. (Riley, 2002)

Besides avoiding U.S. tax on foreign-source earnings, an inverted firm can also avoid U.S. tax on U.S.-source earnings by shifting, or stripping, U.S.-source earnings to lower-tax jurisdictions.² The consulting firm Baker & McKenzie, in a document highlighting the benefits of inversion and the firm's expertise, refers to such stripping as one of the objectives of an inversion transaction. The U.S. Treasury Department is concerned about such stripping and believes that avoidance of U.S. tax on U.S.-source earnings is the primary reason that firms invert (U.S. Department of the Treasury, 2002, p. 21). Although other methods of stripping U.S. earnings exist (e.g., royalty payments, management fees, and transfer pricing arrangements), both the U.S. Treasury and Baker & McKenzie place particular emphasis on stripping through the use of intercompany debt.³ In congressional testimony regarding the Treasury's 2002 inversion report, Pamela Olson, Acting Assistant Secretary for Tax Policy, described the avoidance of U.S. tax through earnings stripping via intercompany debt as "the real 'juice' in an inversion transaction" (Olson, 2002).

She also asserts that existing IRC §163(j), which potentially limits the extent to which a foreign-domiciled firm can strip U.S. earnings through intercompany interest payments (by limiting the U.S. tax deduction for interest paid if U.S. operations are too highly leveraged), needs to be strengthened to help equalize the U.S. tax burdens of foreign-controlled U.S. companies, including inverted firms, and domestic-controlled U.S. companies.

Our sample consists of 12 inversion firms and 24 matched control firms. The effective date of the last inversion included in our sample is June 26, 2002, suggesting that pending anti-inversion legislation with retroactive application dates (e.g., S. 1637), or increased public scrutiny of inversion, has at least temporarily halted the types of inversions examined in this study. We use financial statement data over pre- and post-inversion periods to (i) examine whether inversion reduces ETRs, (ii) analyze the role of earnings stripping in observed ETR reductions, (iii) quantify the tax reduction and earnings improvement derived from earnings stripping, and (iv) re-examine the valuation consequences of inversion. Consistent with the claims of inverted firms' executives, we find that inversion generally results in large ETR reductions. Specifically, for the inversion sample, the mean post-inversion ETR is 20.44 percent; in comparison, the mean pre-inversion ETR is 32.01 percent. The 11.57 percentage point reduction in mean ETR for the inversion sample is significantly greater than the mean ETR reduction for the control sample (approximately four percentage points).

² The incentive to strip U.S. earnings is not limited to inverted U.S. firms. Foreign-domiciled companies (whose foreign domicile was not established via an inversion) with tax rates less than the U.S. rate have similar incentives to strip U.S. earnings. U.S.-domiciled firms also have incentives to strip U.S. earnings. However, their ability to do so is severely limited by statutory interest expense allocation rules. Further, as discussed in Desai and Hines (2002), an inverted structure increases the returns to stripping. U.S.-domiciled firms achieve only *deferral* of income when U.S. earnings are stripped; foreign-domiciled firms (including inverted firms) achieve *permanent exclusion* of income stripped from the U.S.

³ Hufbauer and Assa (2003, p. 5) state that earnings stripping "occurs when an excessive portion of the corporate earnings of a U.S. subsidiary is paid out as interest to the foreign parent corporation (or one of its foreign subsidiaries) and claimed as a deduction against the corporate income of the U.S. subsidiary."

Despite managements' claims that inversion-related tax savings will be due to the avoidance of U.S. tax on foreign earnings, we conclude, based on changes in the percentage of pre-tax income derived from foreign sources (i.e., foreign income shares) and changes in foreign and U.S. pre-tax profit margin percentages, that most of the tax savings is attributable to the avoidance of U.S. tax on U.S. earnings. For the inversion sample, we find that the mean foreign income share increases substantially across pre- and post-inversion periods (from 49 to 81 percent), and that the increase significantly exceeds that for the control sample (from 29 to 39 percent). This large increase in foreign income shares could be due to increased foreign revenue shares and/or improvement (deterioration) in "real" foreign (U.S.) pre-tax profit margin percentages. However, we observe only a modest pre- to post-inversion period increase in the percentage of total revenue derived from foreign sources (37 to 43 percent); hence, it seems unlikely that the large increase in foreign income shares for the inversion sample is due to increased foreign revenue shares. On the other hand, we find that the inversion sample's mean foreign pre-tax profit margin percentage nearly doubles in post-inversion periods (from 11 to 21 percent), while the mean U.S. pre-tax profit margin percentage declines from nine percent in the pre-inversion period to -6.5 percent in the post-inversion period. Since both profit margin changes are significantly different from analogous control sample changes, it is unlikely that the inversion sample's changes are entirely due to economic factors (i.e., changes in "real" profitability). When viewed in combination, these pre- to post-inver-

sion period changes are consistent with inverted firms stripping U.S. earnings to foreign jurisdictions.

We bolster this full-sample evidence of earnings stripping, and provide insight into the stripping mechanism, by exploiting consolidating financial statement schedules of four firms that completed inversions in 2002.⁴ These schedules, required by Securities and Exchange Commission (SEC) regulations when the foreign parent company guarantees debt of the former (U.S.-domiciled) parent company, indicate that U.S.-based intercompany debt and related interest expense for the four firms increased dramatically following their inversions. Specifically, in two post-inversion years (2002 and 2003), these four companies reported a combined total of approximately two billion dollars of U.S.-based intercompany interest expense and fees, a substantial increase over the combined total of \$300 million reported in two pre-inversion years (2000 and 2001). The U.S.-based intercompany interest expense and fees facilitate the shifting of (otherwise) U.S. taxable income to foreign jurisdictions, and we find little evidence that IRC §163(j) restricts such shifting for the four firms. Assuming that two billion dollars of such income is shifted to foreign jurisdictions imposing the firms' average foreign tax rates, the four firms' aggregate, two-year tax savings is approximately \$520 million, and the estimated revenue loss to the U.S. Treasury is approximately \$700 million (which represents 0.17 percent of the total corporate tax revenue collected by the U.S. Treasury in fiscal 2002 and 2003).⁵ Based on additional analysis of the four firms, we attribute most of their realized ETR reductions to earnings strip-

⁴ The four firms are Cooper Industries, Ingersoll-Rand, Nabors Industries, and Noble Drilling. The effective date of Ingersoll-Rand's inversion was actually December 31, 2001; however, inversion-related income consequences, aside from one-time benefits recorded in 2001, were first realized in 2002.

⁵ The \$700 million loss to the U.S. Treasury is 35 percent of two billion dollars. According to the IRS Data Book FY2003 (Publication 55b), corporate tax collections were \$211.4 billion in fiscal year 2002 and \$194.1 billion in fiscal year 2003.

ping through intercompany debt, and estimate that these stripping-derived ETR reductions increased their reported net income approximately 30 percent (on average), relative to the net income that would have been reported in the absence of stripping.

Our study is related to prior research examining the taxpaying status of foreign-controlled domestic corporations (FCDCs), since inversion transforms a U.S.-domiciled multinational firm into a FCDC (albeit through the use of a unique transaction that entails no underlying ownership, managerial or operational changes). Grubert, Goodspeed, and Swenson (1993) and Grubert (1999) document that FCDCs report lower levels of taxable income than U.S.-controlled domestic corporations, and conjecture that some of the difference could be due to income manipulation. Collins, Kemsley, and Shackelford (1997) and Kinney and Lawrence (2000) provide no evidence of such manipulation. However, Mills and Newberry (2004) provide evidence consistent with FCDCs' parent companies utilizing tax-motivated income reporting and debt location strategies. The authors report a significant relation between foreign multinational firms' U.S. taxable income and their average foreign tax rates, and find that FCDCs' debt levels are inversely related to their parents' average foreign tax rates. Consistent with the findings of Mills and Newberry (2004), our study provides evidence that U.S. companies that became FCDCs via inversion do manipulate income, and suggests that intercompany debt is used to facilitate the earnings stripping.

We also extend prior research that has produced inconsistent results regarding the price reaction to inversion announcements (Desai and Hines, 2002; Seida and Wempe, 2002; and Cloyd, Mills, and Weaver, 2003b). We include *ex post* inversion-related ETR changes (a proxy for investors' *ex ante* beliefs regarding the

tax benefits of inversion) as an independent variable in a regression model that analyzes inversion announcement period price reactions. We find no evidence that variation in the price reaction to board approval of inversion is explained by realized ETR changes. However, we find a strong association between realized ETR changes and price reactions to shareholder approval of inversion.

The remainder of this paper is organized as follows. The next section provides background information on corporate inversions and prior inversion-related research. The third section describes our sample. The fourth section presents our full sample analyses. The fifth section presents earnings stripping analyses using information from four firms' consolidating financial statement schedules. The sixth section examines the association between price reactions to inversion announcements and *ex post* ETR changes. The final section summarizes and concludes.

BACKGROUND

An inverted corporate structure is one in which a U.S.-domiciled parent company becomes a subsidiary of a newly-formed, haven-domiciled parent company. Typically, shares of the former parent company are converted to shares of the new, haven-domiciled parent in a transaction that is taxable to shareholders, the former U.S. parent, or both (for explanations of transaction structures, see Lemein and McDonald (2002) or Thompson (2002)). The physical location of corporate facilities does not change, and virtually no operational changes accompany the inversion.

The primary benefits of inversion are potential reductions in corporate income taxes and financial statement ETRs. By establishing domicile in a foreign country, an inverted firm's foreign earnings are no longer subject to U.S. taxation. Executives

of inverting firms often tout such avoidance as the source of inversion-related tax savings, and proxy materials for inversion transactions routinely note that foreign competitors have lower tax burdens because their non-U.S. earnings are not subject to U.S. taxation. Hence, among inverting firms and their executives, the publicly-stated rationale for inversion is that the worldwide tax system applied to U.S.-domiciled firms places them at a competitive disadvantage relative to foreign-domiciled firms, many of which are located in territorial tax systems.⁶

Another potential source of inversion-related tax savings is the avoidance of U.S. tax on U.S. earnings, which can result when intercompany transactions are structured so that a firm's U.S.-based operations (i.e., the former U.S.-domiciled parent, which is now a subsidiary of the foreign parent) incur significant intercompany expenses. This practice, known as earnings stripping, can be achieved in a variety of ways, such as allocating U.S. subsidiaries intercompany debt, requiring them to pay foreign affiliates for the use of intangible assets, or through transfer pricing. The Department of the Treasury (2002) describes tax savings arising from earnings stripping as more quantifiable than savings arising from the elimination of U.S. tax on foreign earnings, and suggests that stripping-derived tax savings are a first-order consideration for firms contemplating inversion. The consulting firm Baker & McKenzie touts such tax savings as a significant benefit of an inversion

transaction. Corporate executives, however, do not publicly acknowledge that U.S. earnings stripping is an anticipated source of tax savings.

Desai and Hines (2002) and Cloyd et al. (2003b) examine inversions, but provide limited evidence regarding earnings stripping. Desai and Hines (2002) analyze the price reaction to The Stanley Work's (Stanley's) proposed inversion. Based on the reaction to Stanley's inversion-related events, Desai and Hines (2002) estimate the present value of the company's inversion to be at least \$250 million, despite the fact that the present value of Stanley's avoidance of U.S. tax on foreign-source income (under an inverted structure) is estimated to be no more than \$83 million. Desai and Hines (2002) conclude that this substantial difference in valuation arose because the market anticipated that Stanley, under an inverted structure, would have significantly reduced U.S. taxes through earnings stripping.⁷

Desai and Hines (2002) and Cloyd et al. (2003b) examine the characteristics of inversion firms relative to control firms.⁸ Desai and Hines (2002) find that inversion firms tend to be larger and more leveraged than control firms, and also report a higher percentage of foreign assets. Cloyd et al. (2003b) also find that inversion firms are generally larger than control firms, but find no significant difference in leverage. Finally, Cloyd et al. (2003b) conclude that inversion firms have significantly higher tax rates in the year prior to the inversion announcement.

⁶ Firms can avoid U.S. tax on foreign earnings by retaining the earnings in the country of origin, and can avoid recording a (GAAP) provision for U.S. taxes by classifying the earnings as *permanently reinvested*. However, Avi-Yonah (2002) notes that U.S. firms still have strong incentives to invert in order to avoid U.S. tax on U.S.-source income, and to avoid application of Subpart F (which results in current U.S. taxation of foreign passive income).

⁷ Stanley ultimately withdrew its inversion proposal in response to intense political and media pressure. Desai and Hines (2002) note that the level of debt necessary for Stanley to strip enough U.S. income to justify the market's higher valuation of the company would not have been restricted by the thin capitalization rules under IRC §163(j).

⁸ Cloyd et al. (2003b) compare inversion firms to non-inverted industry (two-digit SIC) counterparts. Desai and Hines (2002) initially consider all firms with available Compustat and CRSP data as potential control firms, but then screen firms on the basis of continuous provision of export data from 1992 to 1998.

Desai and Hines (2002), Seida and Wempe (2002), and Cloyd et al. (2003b) examine the valuation effects of corporate inversions. Desai and Hines (2002) report that stock price reactions to board of directors approving inversions are, on average, positive, (1.7 percent mean abnormal return weighted by market capitalization), but provide no evidence that the result is statistically significant (ten of 19 sample firms have positive abnormal returns). In regression analyses, Desai and Hines (2002) find that abnormal returns at board approval dates are significantly associated with inverters' past stock price changes and leverage levels, but are not associated with other variables expected to affect the financial benefits of inversion (average foreign tax rates, foreign pre-tax income share, and foreign asset share).⁹ On the other hand, Cloyd et al. (2003b) find no evidence that stock prices increased at the time boards of directors approved inversions. Seida and Wempe (2002) find results similar to Cloyd et al. (2003b) regarding board approval, but report evidence of a positive market reaction to subsequent shareholder approval of inversion. In addition, Seida and Wempe (2002) note that market reactions at shareholder approval of post-Autumn 2001 inversions were significantly smaller than those for pre-Autumn 2001 inversions.¹⁰

SAMPLE SELECTION

Inversion Firms

We searched SEC filings (10K and 8K) on Lexis/Nexis for firms reporting a domicile in one of 41 countries identified as tax havens in the Organisation for Economic Co-Operation and Development 2000 Progress Report. We identified 97 such firms for which at least one year of data are available on Compustat. The indicated tax haven appeared to be 68 firms' initial domicile (i.e., there appeared to be no possibility of an inversion transaction). In addition, five firms were re-domiciling to a tax haven from a country other than the United States, and one firm was privately held for many years preceding and following its inversion. Of the remaining 28 firms, we (i) eliminated nine companies for which the inversion transaction was confounded by a contemporaneous event (e.g., a spin-off), (ii) eliminated one firm (Stanley) that withdrew its inversion proposal subsequent to board and shareholder approval, and (iii) eliminated six insurance firms, thereby restricting the sample to firms that consistently disclose the geographic sources of pre-tax income. Table 1 lists the 12 remaining inversion firms' names, board and shareholder approval dates, effective dates, and four-digit SIC classifications.¹¹

⁹ Past stock price appreciation is a proxy for capital gains taxes imposed on shareholders as a result of inversion. The underlying rationale is that the market construes the magnitude of capital gains tax imposed on existing shareholders as evidence regarding the corporate-level benefits arising from the transaction (i.e., the market anticipates that the capital gains tax burden and corporate-level inversion benefits are positively correlated).

¹⁰ In a New York Times article (Johnston, 2002), a Lehman Brothers tax expert provides a rationale for post-Autumn 2001 inversions having smaller valuation effects, and for the dearth of post-Autumn 2001 inversions: "Any company with a decent amount of foreign income will see its tax rate fall dramatically (if it inverts). But the political considerations sometimes prevail, and companies are understandably reluctant to do something like this because it will not necessarily be properly construed in the marketplace. It may be seen as not patriotic and in the wake of September 11, that is not a good posture for a company." The tax expert cites personal knowledge of several companies that declined inversion proposals for the reason noted.

¹¹ All 12 firms are included in the samples analyzed by Desai and Hines (2002), Cloyd, et al. (2003b), and Seida and Wempe (2002).

TABLE 1
 TWELVE INVERSION FIRMS' BOARD APPROVAL DATES, SHAREHOLDER APPROVAL DATES,
 EFFECTIVE DATES, AND FOUR-DIGIT INDUSTRY CLASSIFICATIONS

Company	Board Approval	Shareholder Approval	Inversion Effective	Four-Digit SIC
Helen of Troy	12-30-93	2-9-94	2-16-94	3634
Triton Energy	2-8-96	3-25-96	3-25-96	1311
Tyco International	3-17-97	7-2-97	7-2-97	9997
Fruit of the Loom	2-10-98	11-12-98	3-4-99	2250
XOMA	11-24-98	12-29-98	1-5-99	2836
Transocean Sedco Forex	3-15-99	5-13-99	5-14-99	1381
Foster Wheeler	11-29-00	4-23-01	5-25-01	1600
Cooper Industries	6-11-01	5-14-02	5-22-02	3640
Ingersoll-Rand	10-16-01	12-14-01	12-31-01	3560
Nabors Industries	1-2-02	6-14-02	6-24-02	1381
Noble Drilling	1-31-02	4-25-02	4-30-02	1381
Weatherford International	4-5-02	6-26-02	6-26-02	3533

Note: The board and shareholders of Stanley Works approved an inversion transaction. However, the company withdrew its inversion proposal on August 1, 2002. Tyco International inverted via a merger transaction.

Control Firms

For each inversion firm, we identified two non-inverted U.S.-based competitors to serve as control firms. We defined an inversion firm's "measurement year" as the year prior to board approval of its inversion, and then determined whether an acceptable control firm was available from a list of the inversion firm's three *key competitors* in the Hoover's Company Capsule Database. For the majority of the inversion firms, we used the *key competitor* with measurement year sales closest in amount to that of the inversion firm (and with required data available on Compustat and CRSP) as the first control firm. For the inversion firms for which no match was available from Hoover's Capsules, we examined the broader list of *competitors* in the Hoover's Company Profile Database, and selected the *competitor* with measurement year sales closest to that of the inversion firm (and with required data available) as the first control firm. For the remaining unmatched inversion firms, the firm on Compustat in the same four-digit SIC class and with measurement year sales closest in amount to the inversion firm's measurement year sales was chosen as the first control firm. We then repeated the entire process to select a second con-

trol firm for each inversion firm. Hence, our final sample consists of 36 firms (12 inversion firms, each matched with two control firms). For the 36 firms included in the sample, the median market value of equity (total assets) at the time of board approval of inversion is \$2.7 billion (three billion dollars), and between-sample size differences are insignificant.

FULL SAMPLE ANALYSIS

In this section, we use the full sample of 12 inversion firms and 24 control firms to examine whether inversion reduces firms' ETRs. We also use certain financial statement ratios, including foreign income shares, in an attempt to determine whether avoidance of U.S. tax on U.S. earnings contributes to any inversion-related ETR reduction. In conducting the analyses, we define the "pre-inversion" period as the three years preceding an inversion's effective year, and the "post-inversion" period as the inversion's effective year plus the two following years (only two years of data are available in the post-inversion period for the 2002 inversions). In all analyses, control firms are aligned in event time with their respective inversion firms. In addition to tests of the inversion sample

itself, we conduct between-sample tests to control for economic effects common to both samples.

Our ETR measure is based on the total income tax expense reported for financial accounting purposes.¹² In general, it is computed as total income tax expense over the pre- or post-inversion period divided by total pre-tax income over the same period. To the extent that a specific disclosure is made about a non-recurring item that affects reported tax expense, we adjust the reported tax expense accordingly.¹³ Table 2 presents the mean values of the ETR measure during the pre- and post-inversion periods, as well the mean across-period change in ETR (post-inversion minus pre-inversion) for both the inversion and control samples. The last three columns of Table 2 (labeled Difference) provide mean between-sample differences in ETRs in the pre- and post-inversion periods, as well as the mean between-sample *difference in changes* in ETRs.

Consistent with the stated expectations of inversion firms' executives, we find that the mean ETR for the inversion sample declined 11.57 percentage points in the post-inversion period (32.01 percent pre-inversion; 20.44 percent post-inversion), and that the decline is significant at $p = 0.005$ in a t -test.¹⁴ The mean ETR for the control firm sample also declines across the pre- and post-inversion periods

(3.98 percentage point decline), although much less than that in the inversion firm sample. Finally, the Difference column in Table 2 produces three inferences: (i) no significant difference in pre-inversion ETRs exists for inversion and control firms ($p = 0.532$, two-tailed test); (ii) inversion firms have lower post-inversion ETRs than control firms ($p = 0.020$, one-tailed test); and (iii) inversion firms, compared to control firms, experience larger ETR reductions in post-inversion periods (-7.59 between sample difference, $p = 0.044$ in a one-tailed t -test).

We use the remaining measures reported in Table 2 to assess whether inversion-related ETR reductions are due to avoiding U.S. tax on U.S. earnings. We first examine the percentage of total pre-tax income that is foreign-source (hereafter *foreign income share*), computed as the sum of foreign pre-tax income in the pre- or post-inversion period, divided by the sum of total pre-tax income during the same period. During the pre-inversion period, the mean foreign income share is substantially higher for inversion firms (49.40 percent) than for control firms (29.30 percent), but the difference is not statistically significant ($p = 0.118$, two-tailed test). For the inversion sample, the mean foreign income share increases 31.79 percentage points ($p = 0.006$, one-tailed test), to 81.19 percent in the post-inversion period. The control firms also exhibit a statistically sig-

¹² Our measure of tax burden is consistent with prior research (Givoly and Hayn, 1992; Amir et al., 2001) and with the view under GAAP that in calculating a given year's earnings, the deferred portion of total income tax is a bona fide expense, despite the fact that it is not payable currently (i.e., total tax expense reflects the expected total tax burden on reported pre-tax book income, irrespective of the timing of the underlying tax payments). In addition, our ETR variable, compared to a variable that uses current taxes in the numerator, is a less noisy measure for capturing permanent rate differences generated by earnings stripping.

¹³ We calculate tax rates in the manner described, rather than averaging annual tax rates, to effectively weight annual tax rates by the magnitude of annual pre-tax income levels; however, inferences are unchanged when annual rates are averaged. Reported tax expense was adjusted for Ingersoll-Rand due to one-time inversion-related tax benefits recorded in 2001, and for Cooper Industries and Weatherford International due to tax settlements for years prior to the pre-inversion period. Firms for which the total tax provision was materially positive over a pre- or post-inversion period, but for which pre-tax income was negative over the period, were coded as having tax rates of 0.5. Further, we bound tax rates at 0 and 0.5 for all sample firms.

¹⁴ Except as otherwise noted, analyses of median ETRs, and of median changes in ETRs, produce results similar to those reported, and non-parametric tests (Wilcoxon signed-rank tests and Wilcoxon tests) produce similar inferences.

TABLE 2
EFFECTIVE TAX RATES, FOREIGN INCOME AND REVENUE SHARES,
AND FOREIGN AND U.S. PRE-TAX MARGINS (ALL %)

	Inversion Firms			Control Firms			Difference (Inversion-Control)		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Effective tax rate									
Mean	32.01	20.44	-11.57	34.84	30.85	-3.98	-2.83	-10.41	-7.59
t-statistic			-3.11			-1.64	-0.64	-2.14	-1.75
p-value			0.005			0.115	0.532	0.020	0.044
Foreign income share									
Mean	49.40	81.19	31.79	29.30	39.06	9.76	20.10	42.13	22.03
t-value			3.11			2.06	1.61	3.31	1.96
p-value			0.006			0.052	0.118	0.001	0.035
Foreign revenue share									
Mean	36.81	43.23	6.42	31.12	33.64	2.52	5.69	9.59	3.90
t-statistic			2.77			1.73	0.62	1.00	1.48
p-value			0.009			0.097	0.536	0.162	0.074
Foreign profit margin									
Mean	10.81	21.03	10.22	7.97	7.75	-0.21	2.84	13.28	10.43
t-statistic			3.41			-0.17	0.81	2.39	3.20
p-value			0.006			0.871	0.439	0.019	0.005
U.S. profit margin									
Mean	9.09	-6.57	-15.66	10.20	2.81	-7.39	-1.11	-9.38	-8.27
t-statistic			-5.37			-2.45	-0.20	-1.33	-1.74
p-value			<0.001			0.027	0.844	0.099	0.048

Note: Change is computed as Post minus Pre. Effective tax rate is the total tax provision divided by total pre-tax income. Foreign income share is foreign-source pre-tax income divided by total pre-tax income. Foreign revenue share is foreign-source revenue divided by total revenue. Foreign (U.S.) profit margin is foreign-source (U.S.-source) pre-tax income divided by foreign-source (U.S.-source) revenue. The pre-inversion period is the three-year period prior to the inversion effective year. The post-inversion period is the inversion effective year plus the two following years, using whatever data are available. The baseline sample is the sample of 12 (24) inversion (control) firms. In tests of foreign pre-tax income shares, Transocean and matches are removed because the sources of Transocean's post-inversion pre-tax income are not disclosed. Transocean and matches are removed in tests of foreign and U.S. pre-tax margins for the same reason. In addition, 1) XOMA and matches are removed because for all three firms, all income is U.S.-source (hence any changes in U.S. margins are unrelated to income shifting); 2) Triton and matches are removed because Triton reports no U.S.-source revenue in the post-inversion period; and 3) Helen of Troy and matches are removed because Helen of Troy reports virtually no foreign-source sales (i.e., the company reports substantial foreign-source pre-tax income, but all foreign sales are intercompany). Finally, one control firm is removed in the test of foreign pre-tax margins because all of the firm's income is U.S.-source. Overall, tests of ETRs and foreign revenue shares are conducted with n = 12 (n = 24) inversion (control) firms. After the noted sample attrition, tests of foreign income shares include n = 11 (n = 22) inversion (control) firms; tests of foreign profit margins include n = 8 (n = 15) inversion (control) firms; and tests of U.S. profit margins include n = 8 (n = 16) inversion (control) firms. In within-sample tests, significance levels for the inversion (control) sample are from one-tailed (two-tailed) t-tests. Except for tests of pre-inversion differences, between-sample tests are one-tailed. Nonparametric tests (signed rank tests and Wilcoxon tests) yielded similar results.

nificant increase in mean foreign income share (9.76 percentage points, $p = 0.052$ in a two-tailed test). However, the Difference columns provide two results that are consistent with earnings stripping on the part of inverted firms. First, we find that inverted firms' mean foreign income share exceeds that of control firms by 42.13 percentage points in the post-inversion period ($p = 0.001$, one-tailed test). In addition, we find that the mean increase

in inverted firms' foreign income shares exceeds the analogous increase for control firms by 22.03 percentage points ($p = 0.035$, one-tailed test). The observed changes in the location of pre-tax income suggest that inverted firms' ETR reductions may be due to the stripping of U.S. income to foreign jurisdictions. However, an alternative explanation is that inverted firms' increases in foreign income shares are due to underlying changes in geographic

revenue sources. To evaluate this possibility, we examine pre- to post-inversion changes in the percentage of total revenue attributable to foreign sources (hereafter *foreign revenue shares*). We then examine pre- to post-inversion changes in U.S. and foreign profit margins to discern whether any profit margin changes are consistent with an earnings stripping hypothesis.

We collected data regarding the geographic sources of total revenue from the footnotes of our sample firms' annual reports or 10-K filings. We compute foreign revenue share by dividing total foreign revenue in the pre- or post-inversion period by total revenue during the same period. In the pre-inversion period, inversion (control) firms derived, on average, 36.81 percent (31.12 percent) of total revenue from foreign sources (see Table 2). As indicated in the Difference column of Table 2, the 5.69 percentage point between-sample difference in the pre-inversion period is not significant ($p = 0.536$, two-tailed test). For the inversion sample, the mean foreign revenue share increases to 43.23 percent in the post-inversion period, and the 6.42 percentage point increase is highly significant ($p = 0.009$, one-tailed test). For the control sample, mean foreign revenue share increased by 2.52 percentage points, which is marginally significant ($p = 0.097$, two-tailed test). Two results from the Difference column provide evidence consistent with post-inversion U.S. earnings stripping among inversion firms. First, we find no significant between-sample difference in the percentage of post-inversion revenue derived from foreign sources (p

$= 0.162$, one-tailed test). In addition, we find only marginally significant evidence of a between-sample difference in the change in foreign revenue shares (3.90 percentage point difference, $p = 0.074$ in a one-tailed test). Although the directions of these differences are consistent with firms inverting in anticipation of an increase in foreign sales activity (and an increase in "real" foreign profitability), the magnitude of these differences suggest that changes in foreign revenue shares likely do not explain the large changes in foreign income shares.

Next, we examine foreign and U.S. pre-tax profit margins.¹⁵ Foreign (U.S.) pre-tax profit margin is defined as the sum of reported pre-tax foreign (U.S.) profit in the pre- or post-inversion period, divided by the sum of reported foreign (U.S.) sales in the same period. We find no significant difference between the inversion and control samples for either profit margin measure in the pre-inversion period (see the Difference column). However, for the inversion sample, we find changes in both profit margin measures that are consistent with earnings stripping. As indicated in Table 2, inversion firms' mean foreign pre-tax profit margin increased from 10.81 percent in the pre-inversion period to 21.03 percent in the post-inversion period; the 10.22 percentage point change is significant at $p = 0.006$ in a one-tailed test. Conversely, we observe marked deterioration in inversion firms' U.S. pre-tax profit margins—from 9.09 percent in the pre-inversion period to -6.57 percent in the post-inversion period. The -15.66 percentage point change is significant at $p < 0.001$ in a one-tailed test.

¹⁵ As explained in Table 2, several inversion and control firms are removed from the sample in conducting these tests due to limitations on data necessary to compute foreign and U.S. profit margins. For U.S. and foreign operations, we test for unusual changes in profit margin percentages that coincide with inversion effective dates. Because the profit margin measures use U.S. and foreign income metrics that reflect stripping effects (e.g., intercompany interest payments), we interpret decreased (increased) U.S. (foreign) margins as evidence of earnings stripping, rather than as evidence of changes in "real" profitability. In a later section, we use more detailed data from four inversion firms' consolidation schedules to provide more direct evidence of earnings stripping via intercompany interest and fee payments.

These changes differ significantly from the analogous changes observed for control firms. In the case of foreign pre-tax margin, inversion firms' improvement exceeds control firms' changes by 10.43 percentage points ($p = 0.005$, one-tailed test). Further, the deterioration of inversion firms' U.S. pre-tax margins exceeds that of control firms by 8.27 percentage points ($p = 0.048$, one-tailed test). These tests included one control sample firm (Pride International) reporting a very unusual post-inversion U.S. pre-tax profit margin percentage (-61 percent). With Pride International removed the statistical significance of the between-sample differences in post-inversion U.S. pre-tax profit margins and pre- to post-inversion changes in profit margins increase substantially.

On balance, it seems unlikely that inversion firms' large increases in foreign pre-tax profit margins, and simultaneous decreases in U.S. pre-tax profit margins, are substantially explained by changes in underlying "real" profitability. Given that these substantial changes are observed across an event (i.e., inversion) that increased the returns to earnings stripping, it seems likely that inversion firms used intercompany transactions to strip U.S. earnings to foreign jurisdictions. Hence, we conjecture that the large post-inversion ETR reductions reported in Table 2 are likely attributable to firms using inverted corporate structures to avoid U.S. tax on U.S. earnings. These results affirm Treasury Department concerns that inversion firms may become more aggressive in shifting taxable income from the U.S. to lower-tax foreign jurisdictions.

ANALYSIS OF FOUR FIRMS' CONSOLIDATING SCHEDULE DATA

In this section we exploit data from consolidating schedules required under Section 3-10 of SEC Regulation S-X (issued in 2000) to more definitively determine whether observed inversion-related ETR reductions are attributable to earnings stripping. Of the 12 inversion firms examined in this study, seven provide such information in footnote disclosures. We examine four of these firms: Cooper Industries, Ingersoll-Rand, Nabors Industries, and Noble Drilling. Table 3 summarizes information from the four firms' consolidating schedules regarding intercompany debt and related interest expense, and the amount of such debt and interest expense definitively attributable to U.S. subsidiaries.¹⁶ The three other firms that provide consolidating schedules (Foster Wheeler, Tyco International, and Weatherford International) are not included in this analysis. Tyco and Weatherford are omitted because neither firm provides consolidating schedules for pre-inversion years. Foster Wheeler is omitted because recent financial distress experienced by the company renders certain financial data difficult to interpret (Foster Wheeler's pre-tax income is negative in four of the five years between 1999 and 2003, and the company has received a going concern opinion since 2001).¹⁷

The inversions for these four firms were effective in 2002 (Ingersoll-Rand's inversion was actually effective December 31, 2001, but income consequences, aside from one-time benefits recorded in 2001,

¹⁶ We deem debt located with the firms' former U.S.-based parent companies as definitively U.S.-based. However, it seems likely that a substantial portion of debt located with "other subsidiaries" is also U.S.-based. All of Nabors Industries 2002 and 2003 intercompany debt is located in "other subsidiaries." In 2002 (2003), Noble Drilling reports \$647.8 (\$621.2) million of intercompany debt for "other subsidiaries."

¹⁷ Foster Wheeler's long-term intercompany debt increased substantially after its inversion. In 2000 (the company's final pre-inversion year), its long-term intercompany debt was \$254.6 million. In 2001, long-term intercompany debt was \$1,656.2 million. The amount disclosed in the company's 2003 consolidating schedule is \$1,877.6 million.

TABLE 3
ANALYSIS OF FOUR INVERSION FIRMS' INTERCOMPANY DEBT AND
INTEREST EXPENSE AS DISCLOSED IN CONSOLIDATING SCHEDULES

Financial data (\$ millions)	2000	2001	2002	2003
Cooper Industries (effective 5/22/2002)				
Total intercompany debt	—	4,610.5	7,100.4	6,098.6
Amount attributable to U.S.	—	4,530.9	5,466.7	5,924.5
Long-term intercompany debt	—	4,048.6	6,385.5	4,986.8
Amount attributable to U.S.	—	3,969.0	4,751.8	4,813.2
Intercompany interest expense and fees	(21.2)	123.2	384.2	348.9
Amount attributable to U.S.	(21.2)	123.2	383.4	338.3
Total assets	4,089.7	4,014.2	4,130.5	4,212.5
Ingersoll-Rand (effective 12/31/2001)				
Total intercompany debt	2,028.0	2,597.9	14,203.0	12,079.5
Amount attributable to U.S.	2,028.0	2,650.0	6,884.1	4,422.1
Long-term intercompany debt	—	0.0	3,647.4	3,647.4
Amount attributable to U.S.	—	0.0	3,647.4	3,647.4
Intercompany interest expense and fees	42.1	17.6	365.6	442.1
Amount attributable to U.S.	42.1	17.6	365.6	442.1
Total assets	10,528.5	11,063.7	10,809.6	10,664.9
Nabors Industries (effective 6/24/2002)				
Total intercompany debt	—	1,931.9	4,168.3	2,141.4
Amount attributable to U.S.	—	—	—	—
Long-term intercompany debt	—	1,931.9	4,168.3	2,141.4
Amount attributable to U.S.	—	—	—	—
Intercompany interest expense and fees	64.6	77.2	155.8	266.9
Amount attributable to U.S.	—	—	—	—
Total assets	3,136.9	4,151.9	5,063.9	5,602.7
Noble Drilling (effective 4/30/2002)				
Total intercompany debt	—	0.0	1,218.3	1,190.5
Amount attributable to U.S.	—	0.0	554.5	569.3
Long-term intercompany debt	—	0.0	573.9	685.6
Amount attributable to U.S.	—	0.0	529.8	511.8
Intercompany interest expense and fees	0.0	0.0	21.0	52.7
Amount attributable to U.S.	0.0	0.0	21.0	49.2
Total assets	3,079.5	3,502.5	3,258.8	3,135.0

Note: Data for intercompany debt and intercompany interest expense and fees are taken from the firms' condensed consolidating financial statements, which are included in the footnotes to the financial statements. The disclosures are required under Section 3-10 of SEC Regulation S-X when a subsidiary issues securities guaranteed by its parent. For Ingersoll-Rand, a December 31, 2001 issuance of \$3,647.4 million of intercompany debt is deemed a 2002 issuance.

were not realized until 2002). As indicated in Table 3, all four firms exhibit sizable increases in both total and long-term intercompany debt subsequent to inverting. Relative to 2001, 2002 total intercompany debt increases by \$2,489.9 million for Cooper, \$11,245.1 million for Ingersoll-Rand

(with the company's December 31, 2001 issuance of intercompany debt deemed a 2002 issuance), \$2,236.4 million for Nabors, and \$1,218.3 million for Noble. A significant portion of these increases are due to changes in long-term intercompany debt levels; from 2001 to 2002

long-term intercompany debt increased by \$2,336.9 million, \$3,647.4 million, \$2,236.4 million, and \$573.9 million, respectively, for the four firms.¹⁸ Consistent with large increases in intercompany debt, Table 3 also shows that 2002 intercompany interest expense and fees for the four firms increased by \$261.0 million, \$348.0 million, \$78.6 million, and \$21 million, respectively, relative to 2001. Except for Cooper Industries, the reported intercompany interest expense and fees for 2003 increased relative to 2002 amounts. For the two post-inversion years, 2002 and 2003, these four companies reported a combined total of \$2,037 million of intercompany interest expense and fees, compared to \$303.5 million for the two pre-inversion years, 2000 and 2001.

The consolidating schedules for three of the firms allow a portion of intercompany debt and interest and fee expense to be definitively attributed to the firms' pre-inversion U.S.-based parents (now subsidiaries of the newly-formed parents). In the cases of Cooper, Ingersoll-Rand, and Noble, most of the noted increase in long-term intercompany debt and intercompany interest expense and fees is definitively attributable to U.S.-based entities and may, therefore, shift U.S. earnings to foreign jurisdictions. Before estimating the potential tax savings and financial statement effects implied by these intercompany expenses, we conduct tests on the same ratios examined in the full sample analysis.

The first part of Panel A in Table 4 shows seven financial statement variables (de-

noted A through G) that are used to compute the ratios we examine. The amounts for each firm reflect annual averages over a three-year pre-inversion period (1999, 2000, and 2001) and a two-year post-inversion period (2002 and 2003), and the across-period change (post minus pre). Based on the pre- and post-inversion period amounts, the bottom half of Panel A shows the five ratios examined in the full sample analysis. For Cooper, Ingersoll-Rand, Nabors, and Noble, we find pre- to post-inversion ETR reductions of 12.84, 23.60, 36.74, and 12.58 percentage points, respectively. Likewise, foreign income shares increase by 52.89, 74.64, 73.45, and 47.89 percentage points, respectively. The average annual total revenue is higher in the post-inversion period for each firm except for Cooper, which experiences a \$168.5 million decline (approximately a four percent decline). The increase in total revenue is attributable to foreign revenue increases since, for each firm, foreign-source revenue increases while U.S.-source revenue decreases. These changes manifest themselves in the foreign revenue share variable. Both Cooper and Ingersoll-Rand report only modest increases in foreign revenue shares across the pre- and post-inversion periods (2.36 and 6.03 percentage point increases, respectively), while Nabors and Noble have more substantial increases (15.93 and 17.59 percentage points, respectively). All four of these changes in foreign revenue shares are considerably smaller than the changes in foreign income shares noted above. Finally, each of the four firms re-

¹⁸ Ingersoll-Rand's (IR's) October 30, 2001 registration statement (p. 17) describes a transaction, executed in conjunction with its inversion, in which "IR-New Jersey and certain of its subsidiaries will transfer shares of certain existing subsidiaries of IR-New Jersey (the "Transferred Assets") and issue certain debt (the "Debt") to IR-Limited in exchange for which IR-Limited will issue that number of IR-Limited Class B common shares that has an aggregate value equal to the fair market value of the Transferred Assets and the amount of the Debt." Footnotes 13 and 20 of IR-Limited's 2002 annual report indicate that the note and shares of certain IR-New Jersey subsidiaries were exchanged for 135.3 million shares of IR-Limited class B shares, and that the note, due in 2011, has a fixed rate of interest of 11 percent per annum payable semi-annually. The amount of the note was \$3,647 million. The business purpose of the subsidiaries' receipt of class B shares of IR-Limited is unclear. The class B shares are non-voting shares, but are entitled to dividends equivalent to those paid on class A shares (although IR entities entitled to receive dividends on class B shares declined the dividend).

TABLE 4
EFFECTIVE TAX RATES, PRE-TAX INCOME AND REVENUE SOURCES, AND FOREIGN AND U.S. PROFIT MARGINS FOR THE REDUCED SAMPLE: COMPARISONS OF PRE- AND POST-INVERSION PERIODS

Panel A: Selected financial statement (\$ millions) and computed (%) variables for four inverters: Pre- versus post-inversion

	Cooper Industries			Ingersoll-Rand			Nabors Industries			Noble Drilling		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Financial statement variables												
(all \$ million):												
Pre-tax income (A)	461.6	313.4	-148.3	639.1	537.7	-101.4	271.5	157.7	-113.8	233.9	215.2	-18.8
U.S. pre-tax income (B)	345.4	68.8	-276.7	477.1	623.7	146.0	199.4	110.3	-309.7	128.9	15.5	-113.4
Foreign pre-tax income (C)	116.2	244.6	128.4	162.1	623.7	461.6	72.1	268.0	195.9	105.1	199.7	94.6
Total revenue (D)	4179.4	4011.0	-168.5	8715.6	9413.8	698.1	1388.3	1685.7	297.4	863.6	986.9	123.3
Total U.S. revenue (E)	3228.6	3003.8	-224.9	5655.6	5541.0	-114.6	1112.6	1082.4	-30.2	412.8	298.2	-114.7
Total foreign revenue (F)	950.8	1007.2	56.4	3060.1	3872.8	812.7	275.7	603.3	327.6	450.8	688.8	238.0
Total tax (adjusted) (G)	161.4	69.4	-92.1	218.9	57.3	-161.6	101.2	0.8	-100.4	59.0	27.2	-31.8
Computed variables (all %):												
Effective tax rate (G/A)	34.97	22.13	-12.84	34.24	10.65	-23.60	37.27	0.54	-36.74	25.23	12.64	-12.58
Foreign income share (C/A)	25.17	78.06	52.89	25.36	100.00	74.64	26.55	100.00	73.45	44.91	92.80	47.89
Foreign revenue share (F/D)	22.75	25.11	2.36	35.11	41.14	6.03	19.86	35.79	15.93	52.20	69.79	17.59
Foreign profit margin (C/F)	12.22	24.29	12.06	5.30	16.10	10.81	26.15	44.41	18.26	23.31	28.99	5.69
U.S. profit margin (B/E)	10.70	2.29	-8.41	8.44	0.00	-8.44	17.93	0.00	-17.93	31.22	5.20	-26.02

Panel B: Comparison of inversion and control firms' means

	Four Inversion Firms			Eight Control Firms			Difference (t-value in parentheses)		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Computed variables (all %):									
Effective tax rate	32.93	11.49	-21.44	34.49	33.07	-1.42	-1.56 (-0.69)	-21.58 (4.26) ^a	-20.02 (-3.72) ^a
Foreign income share	30.51	92.71	62.20	32.88	41.94	9.06	-2.39 (-0.19)	50.77 (3.37) ^a	53.16 (4.41) ^a
Foreign revenue share	32.48	42.96	10.48	36.38	37.93	1.55	-3.90 (-0.30)	5.03 (0.35)	8.94 (2.43) ^b
Foreign profit margin	16.74	28.45	11.71	7.85	7.63	-0.22	8.89 (1.79) ^c	20.82 (3.41) ^a	11.93 (3.06) ^b
U.S. profit margin	17.07	-1.06	-18.13	11.03	-1.63	-12.66	6.04 (0.62)	0.57 (0.06)	-5.47 (-0.64)

Note: The Change column is computed as Post minus Pre. ^{a, b, c} indicate $p < 0.01$, $p < 0.05$, and $p < 0.10$ in two-sample t-tests. Except for pre-inversion differences, the between-sample tests are one-tailed. Significance levels are similar using the nonparametric Wilcoxon test (except the difference in the U.S. pre-tax profit margin in the post-inversion period is significant at $p < 0.074$).

ports a substantial pre- to post-inversion increase (decrease) in its foreign (U.S.) pre-tax profit margin percentage.

Table 4, Panel B, provides a comparison of the changes in the means of the four inverted firms' computed variables to analogous changes for their eight matched control firms. In general, the inferences from this analysis are similar to those from the full-sample analysis. The mean ETR of the four inversion firms (eight control firms) declines from 32.93 percent (34.49 percent) in the pre-inversion period to 11.49 percent (33.07 percent) in the post-inversion period. From the last three columns of Table 4, Panel B, we note that (i) pre-inversion ETRs do not differ significantly between inversion and control firms, (ii) inversion firms' mean post-inversion ETR is 21.58 percentage points lower than control firms' mean post-inversion ETR (with the difference significant at $p < 0.001$), and (iii) the pre- to post-inversion reduction in ETR for inversion firms exceeds that of control firms by 20.02 percentage points ($p = 0.002$).

The four inversion firms have a significantly larger increase in foreign income shares (53.16 percentage point between-sample difference, $p < 0.001$) and foreign revenue shares (8.94 percentage point difference, $p = 0.018$), and a shift toward higher margins on foreign-source revenue (11.93 percentage point between-sample difference in the change in foreign pre-tax margin, $p = 0.007$). Consistent with the increased foreign profitability in the post-inversion period being due to earnings stripping, we find that inversion firms' U.S. pre-tax profit margin percentages decline in the post-inversion period. However, since the mean U.S. pre-tax profit margin for the eight control firms also declines, none of the reported between-sample tests of U.S. pre-tax profit margin is significant. However, as in the full sample analyses, the control firms' reported means are highly influenced by Pride International's large negative U.S.

pre-tax profit margin percentage in the post-inversion period. Excluding Pride International, the control firms' pre- and post-inversion mean U.S. pre-tax profit margins are 15.80 percent and 6.88 percent, respectively, and the post-inversion difference between the four inversion firms and the remaining control firms is significant in both a t -test ($p = 0.0129$) and a Wilcoxon signed rank test ($p = 0.024$). The between-sample difference in changes in U.S. profit margin percentages is not significant in a t -test ($p = 0.117$) but is marginally significant in a Wilcoxon signed-rank test ($p = 0.078$). In summary, the pre- to post-inversion period changes in foreign income shares and profit margin percentages for the inversion firms are consistent with ETR reductions arising from earnings stripping.

The intercompany interest and fees reported in Table 3 allow the shifting of (otherwise) U.S. taxable income to foreign jurisdictions, and likely contribute substantially to the four firms' realized ETR reductions reported in Table 4. We use the intercompany interest expense and fees amounts reported in Table 3 to estimate the potential tax savings, ETR reductions, and earnings changes attributable to earnings stripping for the two post-inversion years (i.e., 2002 and 2003). Table 5 presents these estimates, and underlying data, for the four inversion firms. The reported dollar amounts for each firm reflect the sum of the reported amounts for 2002 and 2003, and the average foreign tax rate is computed by combining both years. Our estimate of the U.S. tax savings from stripping assumes that U.S. income is subject to the 35 percent U.S. statutory tax rate (thus, we ignore state income tax consequences), and that the stripped income is subject to foreign income taxes at the firms' average foreign tax rates (although it seems likely that income is stripped to jurisdictions imposing tax rates less than the firms' average foreign tax rates). The firm-specific estimated stripping-related

TABLE 5
ESTIMATED 2002 AND 2003 U.S. TAX SAVINGS AND FINANCIAL STATEMENT EFFECTS OF EARNINGS STRIPPING THROUGH REPORTED INTERCOMPANY INTEREST EXPENSE AND FEES

	Cooper Industries	Ingersoll-Rand	Nabors Industries	Noble Drilling	Total
Intercompany interest expense and fees (A)	\$733.1	\$807.7	\$422.7	\$73.7	\$2,037.2
Average foreign tax rate (B)	12.49%	8.48%	6.66%	7.26%	—
Estimated stripping-related U.S. tax savings (C) [A*(.35-B)]	\$165.0	\$214.2	\$120.0	\$20.4	\$519.6
Reported tax expense (D)	\$138.7	\$114.5	\$1.7	\$54.4	\$309.3
Stripping-adjusted tax expense (E) [C+D]	\$303.7	\$328.7	\$121.7	\$74.8	\$828.9
Total pre-tax income (F)	\$626.7	\$1,075.4	\$315.4	\$430.3	\$2,447.8
ETR [D/F]	22.13%	10.65%	0.54%	12.64%	12.64%
Stripping-adjusted ETR [E/F]	48.46%	30.57%	38.59%	17.38%	33.86%
Reported net income (G)	\$488.0	\$960.9	\$313.7	\$375.9	\$2,138.5
Stripping-adjusted net income (H) [G-C]	\$323.0	\$746.7	\$193.7	\$355.5	\$1,618.9
Percentage increase in net income from stripping [C/H]	51.08%	28.69%	61.95%	5.74%	32.10%

Note: The dollar amounts reported for each firm reflect the sum over the two post-inversion years (2002 and 2003). The average foreign tax rate is computed as the sum of foreign income taxes in 2002 and 2003, divided by the sum of foreign pre-tax income in 2002.

U.S. tax savings over the post-inversion period is computed by multiplying the total intercompany interest expense and fees reported for 2002 and 2003 by the difference between 35 percent and the average foreign tax rate. The estimated two-year tax savings varies from a low of \$20.4 million for Noble to a high of \$214.2 million for Ingersoll-Rand. The total estimated stripping-related U.S. tax savings for the four firms is \$519.6 million. Assuming these earnings would have been subject to U.S. taxation, the estimated potential revenue loss to the U.S. Treasury is \$713 million [\$2,037.2 million*.35].¹⁹

Based on the estimated stripping-related tax savings, we compute stripping-adjusted tax expense amounts by adding the reported tax expense amounts to the stripping-related tax savings amounts. We then use these adjusted tax expense

amounts to compute stripping-adjusted ETRs. For comparison, Table 5 also includes the *as reported* ETRs. The stripping-adjusted ETRs are 48.46, 30.57, 38.59, and 17.38 percent for Cooper, Ingersoll-Rand, Nabors, and Noble, respectively. In comparison, the *as reported* post-inversion ETRs are 22.13, 10.65, 0.54, and 12.64 percent. We assess the extent to which the documented ETR reduction across the pre- and post-inversion periods (see Table 4) is due to stripping by comparing the stripping-adjusted post-inversion ETRs to the pre-inversion period ETRs. For both Cooper and Nabors, their stripping-adjusted ETRs exceed their pre-inversion period ETRs (i.e., 48.46 percent vs. 34.97 percent and 38.59 percent vs. 37.27 percent, respectively); thus, we conclude that their entire pre-to-post period ETR reductions are due to earnings stripping.²⁰

¹⁹ Also, consistent with earnings stripping, we note that (for the four firms) the average annual current U.S. tax was positive in the pre-inversion period, but negative in the post-inversion period, and average annual total income tax paid declined 72 percent from the pre-inversion period to the post-inversion period.

²⁰ In the calculation for Nabors, we assume that all intercompany interest and fee expense is U.S.-based, although the company's consolidating schedule disclosures are not sufficiently detailed to know that with certainty.

Based on Ingersoll–Rand’s stripping–adjusted ETR of 30.57 percent, it appears that, in the absence of earnings stripping via intercompany interest and fees, the company’s ETR would have declined by 3.67 percentage points (computed as 34.24 percent pre–inversion ETR less 30.57 percent stripping–adjusted ETR), compared to the 23.60 percentage point decline reported in Table 4. Thus, we estimate that 84 percent $[(23.60 - 3.67)/23.60]$ of Ingersoll–Rand’s total ETR reduction is derived from earnings stripping. Based on similar analyses, we estimate that 38 percent of Noble’s ETR reduction is due to earnings stripping $[(12.59 - 7.85)/12.59]$.

The last line of Table 5 estimates the percentage increase in post–inversion period net after–tax income (from continuing operations) due to the earnings–stripping related tax savings. The stripping–adjusted net income is computed as reported net income minus the estimated stripping–related U.S. tax savings. Across the four inversion firms, the total mean percentage increase in net income from stripping is 32.10 percent (see Total column). The specific percentage increases for each firm are 51.08, 28.69, 61.95, and 5.74 percent for Cooper, Ingersoll–Rand, Nabors, and Noble, respectively.²¹

IRC Section 163(j) potentially limits the ability of foreign corporations to strip earnings from related U.S.–based corporations by restricting the U.S. tax deduction for interest paid from a U.S.–based corporation to a related foreign corporation. Under existing rules, IRC §163(j) applies only

when a U.S. group’s debt–to–equity ratio exceeds 1.5. Short–term debt (such as accounts payable) is not considered debt for purposes of this debt–to–equity ratio (Reg. §1.163(g)–(b)(2)(i)). For U.S.–based groups with debt–to–equity ratios in excess of 1.5, §163(j) disallows a current period tax deduction for related–party interest expense to the extent the U.S.–based group’s total interest expense (net of interest income) exceeds 50 percent of the group’s adjusted taxable income (i.e., taxable income before interest expense, depreciation, amortization, and depletion). Disallowed interest expense can be carried forward and utilized in future periods. Based on the 2002 and 2003 consolidating balance sheets, it appears that Section 163(j) would not apply to Ingersoll–Rand, Nabors, and Noble, because their U.S.–group debt–to–equity ratios are likely below 1.5. In the case of Cooper, it is possible that §163(j) limits the deductibility of U.S.–based entities’ interest expense. Assuming that all of Cooper’s U.S.–based operations are included under the heading “Cooper Ohio” in the firm’s consolidating schedules, the computed debt–to–equity ratio exceeds four. However, it seems likely that a number of U.S.–based corporations are actually included in the consolidating schedules under “Other Subsidiaries,” which have a debt–to–equity ratio less than 0.30 (when Cooper Ohio and Other Subsidiaries are combined, the debt–to–equity ratio is less than 0.90).²²

In reaching conclusions regarding the earnings stripping behavior of these four

²¹ If we restrict the stripping–adjusted ETR to be no greater than the firm’s pre–inversion period ETR, then the estimated stripping–related U.S. tax savings for Cooper and Nabors become \$80.5 million and \$117.5 million, respectively (the other two firms’ estimates are not affected). With these changes, the percentage increase in net income from stripping for Cooper, Nabors, and the Total column become 19.75, 59.90, and 25.40 percent.

²² Several proposals to modify §163(j) have been considered or are presently under consideration. H.R. 2896 and U.S. Treasury proposals would reduce or eliminate the 1.5 debt–to–equity ratio safe harbor, and reduce the 50 percent of adjusted taxable income allowance. Other provisions would limit interest deductions when a U.S.–based group is more highly leveraged than the corporation’s non–U.S.–based operations. A Senate proposal (S.1637) also provides increased restrictions on earnings stripping. However, unlike the House bill, S.1637 applies only to inverted firms. S.1637 also contains anti–inversion provisions retroactive to March 20, 2002. For summaries of anti–stripping proposals, see Hufbauer and Assa (2003), International Economics Policy Briefs (PB03–07), or Gravelle (2004).

inverted firms, we acknowledge that our calculations may be subject to considerable noise, and that we use financial statement disclosures as mere proxies for the actual data reported on these four firms' tax returns. Nevertheless, based on our analysis, we conclude that substantial portions of the ETR reductions and post-inversion earnings reported by these four firms are the result of stripping U.S. earnings to lower-tax jurisdictions.

ALTERNATIVE EVIDENCE ON THE MARKET REACTION TO INVERSION

Our finding that inversion produces substantial financial benefits is somewhat inconsistent with the mixed evidence reported in prior research on the valuation consequences of inversion. Desai and Hines (2002) examine the market reaction to boards of directors approving inversion transactions and report little evidence that, on average, the market views corporate inversion as a value-added choice. However, the study reports some evidence that cross-sectional variation in price reactions to board approval is explained by variables (e.g., leverage) proxying for potential inversion-related tax savings. Seida and Wempe (2002) and Cloyd et al. (2003b) find no evidence of a positive market reaction to boards of directors approving inversion transactions. However, Seida and Wempe (2002) report results suggesting that the market reacts favorably to subsequent *shareholder* approval of inversion.

We utilize the full sample of 36 firms to examine the association between pre- to post-inversion changes in ETRs and abnormal returns earned at the times of board and shareholder approval of inversion. That is, unlike prior research that uses *ex ante* proxies for inversion benefits, we use the *ex post* ΔETR variable (i.e.,

post-inversion *ETR* minus pre-inversion *ETR*) to represent investors' expectations regarding future inversion-related tax benefits. The regression model is:

$$\begin{aligned}
 [1] \quad ABNORMAL = & \beta_0 + \beta_1 CONTROL \\
 & + \beta_2 \Delta ETR + \beta_3 \Delta ETR * CONTROL \\
 & + \beta_4 EARLY + \beta_5 EARLY * CONTROL \\
 & + \beta_6 PRICECHG + \beta_7 PRICECHG \\
 & * CONTROL + \varepsilon,
 \end{aligned}$$

where:

ABNORMAL is the three-day abnormal return around the board or shareholder approval date;²³

CONTROL is a binary variable coded one if the firm is a control firm, 0 if it is an inversion firm;

ΔETR is the pre- to post-inversion change in *ETR*;

EARLY is a binary variable coded one if the shareholder approval date precedes Autumn 2001, 0 if it is subsequent to Autumn 2001; and

PRICECHG is the percentage price change in the company's stock over the 252 trading days (approximately one year) preceding the shareholder approval date.

To the extent that investors anticipate the tax benefits captured by ΔETR , we expect β_2 to be negative and β_3 to be positive (note that negative ΔETR values indicate tax rate reductions). Consistent with Seida and Wempe (2002), we anticipate that inversion's positive valuation effects dissipate for inversions approved after Autumn 2001. A positive β_4 (indicating greater abnormal returns for pre-Autumn 2001 inversions) and a negative β_5 (indicating that the time trend differs for inversion and control firms) would support this predic-

²³ The index is the return on the S&P 500, and days -260 through -11 are used as the estimation period.

tion. Following Desai and Hines (2002), we include in [1] the one-year percentage price change in a firm's stock (*PRICECHG*) as an indirect measure of inversion benefits. If a firm with a substantially appreciated stock price elects to invert (which typically subjects shareholders to capital gains tax), it follows that the firm believes the present value of future inversion-related benefits dominates the tax cost borne by current shareholders at the transaction date. Hence, we expect that β_6 will be positive, and that β_7 will be negative.

In estimating [1] using board approval abnormal returns, we find no evidence of associations between abnormal returns and any of the independent variables (the model's Adjusted R² is negative). Therefore, we present results related to the model examining shareholder ap-

proval abnormal returns only. Table 6, Panel A, provides full and split-sample descriptive statistics for the variables included in [1]. With no distinction drawn between pre- and post-Autumn 2001 inversions, the between-sample difference in shareholder approval abnormal returns, although positive, is insignificant ($p = .233$). Aside from *CONTROL*, which differs between samples by design, only ΔETR differs between samples ($p = .044$, as in Table 2).

As indicated in Table 6, Panel B, the model explains a substantial portion of the cross-sectional variation in shareholder approval abnormal returns (Adjusted R² of 46 percent). The coefficient estimates for inversion firms (i.e., β_2 , β_3 , and β_6) are significant in the predicted directions at the 0.005, 0.001, and 0.003 levels, respec-

TABLE 6
DESCRIPTIVE STATISTICS AND REGRESSION RESULTS

Panel A: Descriptive statistics									
	Inversion Firms			Control Firms			Difference (Inverter-Control)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	p-value
<i>ABNORMAL</i>	0.038	0.022	0.088	0.017	0.012	0.047	0.020	0.010	0.233
<i>CONTROL</i>	0	0	0	1	1	0	-1	-1	0.000
ΔETR	-0.116	-0.116	0.129	-0.040	-0.016	0.119	-0.076	-0.100	0.044
<i>EARLY</i>	0.583	1	0.515	0.583	1	0.504	0	0	1.000
<i>PRICECHG</i>	0.046	-0.041	0.416	-0.012	-0.101	0.421	0.058	0.060	0.700

Panel B: Regression results						
[1] $ABNORMAL = \beta_0 + \beta_1 CONTROL + \beta_2 \Delta ETR + \beta_3 \Delta ETR * CONTROL + \beta_4 EARLY + \beta_5 EARLY * CONTROL + \beta_6 PRICECHG + \beta_7 PRICECHG * CONTROL + \varepsilon$						
Variable	Coef.	Pred. Sign	Coef. Est.	Std. Error	p-value	
<i>INTERCEPT</i>	β_0	?	-0.081	0.033	0.020	
<i>CONTROL</i>	β_1	?	0.082	0.036	0.031	
<i>DETR</i>	β_2	-	-0.368	0.131	0.005	
<i>DETR*CONTROL</i>	β_3	+	0.386	0.161	0.012	
<i>EARLY</i>	β_4	+	0.121	0.033	0.001	
<i>EARLY*CONTROL</i>	β_5	-	-0.091	0.038	0.012	
<i>PRICECHG</i>	β_6	+	0.134	0.034	0.003	
<i>PRICECHG*CONTROL</i>	β_7	-	-0.167	0.043	0.001	

Model F-value = 5.33 ($p < 0.001$)
Adjusted R-square = 46.41%

Note: n = 36 (12 inversion firms and 24 matched control firms). *ABNORMAL* is the three-day abnormal return at the shareholder approval date. *CONTROL* is a binary variable coded one if the firm is a control firm; 0 if the firm inverted. ΔETR is the post-inversion effective tax rate minus the pre-inversion effective tax rate. *EARLY* is a binary variable coded one if shareholder inversion approval pre-dates Autumn 2001, 0 otherwise. *PRICECHG* is the percentage price change for the company's stock over the 252 trading days preceding shareholder approval. In Panel A, p-values are from two-sample t-tests (one-tailed for *ABNORMAL* and ΔETR ; two-tailed for *CONTROL*, *EARLY*, and *PRICECHG*). In Panel B, p-values for all parameter estimates other than β_0 and β_1 are from one-tailed tests.

tively.²⁴ Likewise, benchmarking inversion firms to control firms yields results (for β_3 , β_5 , and β_7) that are significant at the 0.012, 0.012, and 0.001 levels, respectively. For each of the constructs (i.e., ΔETR , $EARLY$, and $PRICECHG$) in [1], the results indicate a highly significant correlation with $ABNORMAL$ for inversion firms, but no correlation for control firms (in joint coefficient tests, the main coefficients for control firms are not significant for any of the three constructs). In summary, the results in Table 6 indicate that the market appears to incorporate anticipated inversion benefits into share prices.

The results reported in Table 6 are subject to two caveats. First, Cloyd et al. (2003a) suggest that little justification exists for positing a market reaction to shareholder approval of inversion, since shareholders generally overwhelmingly approve inversion transactions (of the inversions examined in Cloyd et al. (2003a), 12 of the 13 that disclosed actual voting results were approved by more than 80 percent of shares voted). The inability of research to detect a significant market reaction to *board* approval of inversion, yet document a significant reaction to subsequent *shareholder* approval, is perplexing.²⁵ However, prior research has

produced similar results. Heron and Lewellen (1998) examine 294 U.S. firms that announced state domicile changes, and consider whether the price reaction to such changes is consistent with the management self-interest (i.e., takeover defense) and/or contractual efficiency (i.e., liability limits) hypotheses. The authors report little evidence of a significant market reaction to *initial* reincorporation announcements, but find evidence of a significant market reaction to *subsequent shareholder approval* of such moves. Heron and Lewellen (1998) note that information regarding the impact of reincorporation may be conveyed at shareholder meetings, and that prior to shareholder approval, uncertainty regarding vote outcomes may exist (despite the fact that in the sample examined, all 294 proposed reincorporations were subsequently approved by shareholders).

Cloyd et al. (2003a) note that three of the shareholder approval abnormal returns related to firms included in the sample are unusually large and possibly confounded, because: (i) Foster Wheeler (21.3 percent abnormal return) announced earnings and declared a dividend on its shareholder approval date; (ii) Tyco International (5.0 percent abnormal return)

²⁴ We considered the economic significance (or reasonableness) of the coefficient on ΔETR . The coefficient on ΔETR (-0.368) multiplied by mean ΔETR in the inversion sample (-0.116) is 4.3 percent. The 4.3 percent might be viewed as that portion of a typical inversion firm's total abnormal return that relates exclusively to inversion-related tax benefits (derived either from the elimination of U.S. tax on foreign earnings or from income stripping, both of which would affect ΔETR). For the 12 inversion firms included in the analysis, mean market value of equity is \$3.231 billion. Therefore, the tax-savings-related increase in market value for the typical inverting firm is \$139 million (i.e., \$3.231 billion x 4.3 percent), or roughly \$25 million of annual tax savings discounted at 12 percent for 10 years.

²⁵ Cloyd et al. (2003b) provide three potential explanations for the market's apparent non-reaction to board approval of inversion: (i) news of inversions leaks prior to board approval, (ii) any future corporate tax savings are offset by other costs, and (iii) substantial uncertainty exists regarding shareholder approval of inversion. Cloyd et al. (2003b) examine returns prior to board approval announcements, but find no evidence consistent with news of inversions being leaked. Another explanation is that uncertainty exists with regard to the extent of the inversion-related benefits. From additional analyses (results not tabulated), we find that analysts' quarterly earnings forecast errors for inversion firms increase in post-inversion quarters, both absolutely and relative to control firms' forecast errors. (i.e., analysts underestimate inversion firms' post-inversion after-tax earnings). One interpretation of this finding is that analysts, and perhaps the market at large, have difficulty estimating the financial impact of inversion. An alternative interpretation of this finding is that managers of inversion firms defer pre-inversion income into lower-tax post-inversion periods.

inverted in a merger-related transaction; and (iii) Triton Energy (19.9 percent abnormal return) announced a major oil strike on the day following its inversion approval. With the possible exception of Triton's abnormal return, we believe these firms' abnormal returns are reasonable estimates of the inversion announcement reactions. Regarding Foster Wheeler, the earnings announcement met the forecast, and the dividend announced was merely a continuing dividend. In the case of Tyco International, we have no priors regarding any reaction to the *merger* component of the company's inversion. In addition, Seida and Wempe (2003) provide evidence that Tyco's abnormal return at inversion approval far exceeded its abnormal returns around the times of other of its (non-inversion) mergers. Although some ambiguity exists regarding the newsworthiness of Triton's oil strike (Seida and Wempe, 2003), the business press generally attributed the spike in the company's stock price to the oil strike, rather than to its inversion approval. Given the ambiguity regarding Triton's abnormal return, we deleted the company (and its control firms) from the sample and re-estimated [1]. All regression variables remain significant at $p < 0.05$ or better. Hence, while the results reported in Table 6 remain subject to general concerns related to the small sample, our inferences are not sensitive to the retention of Triton in the sample.²⁶

CONCLUSION

Based on the analyses and results described in this study, we reach three primary conclusions regarding corporate inversion. First, inversion allows firms to substantially reduce their effective tax rates. We find that a typical inversion firm experiences an 11.6 percentage point reduction in its effective tax rate, or roughly a one-third reduction in its pre-inversion total income tax burden. Second, despite managers' claims that inversion is necessary to avoid U.S. tax on foreign earnings, most of the observed inversion-related tax reduction is likely due to avoidance of U.S. tax on U.S. earnings through increased stripping of U.S. earnings to lower-tax foreign countries. Specifically, we find that inverted firms report dramatic increases in the percentages of their total pre-tax income derived from foreign sources, and we rule out underlying trends in "real" domestic and foreign profitability as the predominant source of the increase. Consistent with concerns expressed by the Treasury Department, we conclude from a detailed analysis of four inversion firms that a large portion of the reduction (increase) in post-inversion ETRs (foreign pre-tax income shares) is attributable to the stripping of U.S. earnings via intercompany interest payments. Third, inversion-related tax savings are, to some extent, reflected in market prices. We examine the association between inversion

²⁶ We examined the sensitivity of our results to the inclusion of the other firms identified by Cloyd et al. (2003a) as having potentially confounded abnormal returns. We first separately removed Foster Wheeler and Tyco (along with their control firms) from the full sample and re-estimated [1]. With either firm removed, all coefficients were significant at $p < 0.05$. Next, we removed each of the three possible pairings of Triton Energy, Foster Wheeler, and Tyco (along with match firms) and re-estimated [1]. With Triton Energy and Foster Wheeler removed, the significance of the $\Delta ETR * CONTROL$ interaction declined to $p = 0.150$, and all other coefficients remained significant at $p < 0.10$. With Triton Energy and Tyco or Foster Wheeler and Tyco removed, all coefficients were significant at $p < 0.05$. Finally, we removed all three inversion firms and their associated matches (i.e., 25 percent of the sample). The significance of the $EARLY * CONTROL$ ($\Delta ETR * CONTROL$) coefficient deteriorated to $p = 0.194$ ($p = 0.106$), $DPRC$ and its related interaction were insignificant, and remaining coefficients were significant at $p < 0.10$ or better. Hence, if no portion of the abnormal returns earned by Triton Energy, Foster Wheeler, and Tyco upon shareholder approval of their inversions was actually inversion-related (despite their consistency with our model's predictions), then several of the inferences we draw from our primary results should be interpreted with caution.

firms' realized effective tax rate changes and the abnormal returns they earn at the times of board and shareholder approval of their inversions, and find evidence that the shareholder approval price reaction is strongly associated with realized effective tax rate changes.

Despite its uniqueness, an inversion transaction effectively transforms a U.S.-based multinational firm into an FCDC. Therefore, our study contributes to prior research examining FCDCs' tax planning strategies. Although numerous studies (e.g., Grubert et al. (1993), Grubert (1999), Kinney and Lawrence (2000))²⁷ suggest that FCDCs pay relatively less tax than U.S.-controlled domestic corporations, prior research has been unable to attribute the difference to intercompany income shifting (e.g., Collins et al. (1997), Kinney and Lawrence (2000)). Mills and Newberry (2004) do not explicitly examine intercompany transactions, but report evidence that FCDCs with parent companies subject to low foreign tax rates employ more debt in their capital structures. Therefore, our evidence suggesting that inverted firms use intercompany debt to strip U.S. earnings and reduce their tax burdens is generally consistent with Mills and Newberry's (2004) conclusions, which were based on an analysis of a broader sample of FCDCs.

Policymakers grappling with the corporate inversion issue face difficult challenges. First, to the extent U.S. policies related to taxation of foreign earnings create competitive disadvantages for U.S.-domiciled firms, appropriate tax relief is warranted. However, the development of new impediments to the earnings stripping behavior documented in this study is equally important. Based on the results of our analysis, we conclude that inverted firms' (presumed) *technical* compliance

with current, rule-based impediments to earnings stripping is producing U.S. tax outcomes (i.e., liabilities) that bear very little resemblance to underlying economic events and circumstances. In other words, it seems implausible that the earnings stripping behavior we document is consistent with the notion that a fair tax system must favor substance over form, and that the tax treatments of income and expense items should produce a result that clearly reflects an entity's income. However, any anti-stripping legislation that applies to all foreign multinationals, rather than just inverted firms, would surely invite retaliatory tax law changes by other countries (Hufbauer and Assa, 2003). But any legislation applying only to inversions, such as that contained in the Jumpstart Our Business Strength bill (S.1637), would afford (non-inverted) foreign firms an ability to strip U.S. earnings that could not be duplicated by an inverted firm. This policy puzzle is difficult to solve without underlying tax reform. The appropriate policy response may depend in part on obtaining explicit evidence on the extent to which non-inversion FCDCs avoid U.S. tax on U.S. earnings through intercompany interest payments or other intercompany transactions.

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²⁷ Contrary to these studies' findings, Blouin, Collins, and Shackelford (forthcoming) examine 31 1996 acquisitions and find no evidence that taxable income decreases more after a foreign firm acquires a U.S.-based firm, than after a U.S.-based firm acquires a U.S.-based firm.

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REFERENCES

- Amir, Eli, Michael Kirschenheiter, and Kristen Willard.
 "The Aggregation and Valuation of Deferred Taxes." *Review of Accounting Studies* 6 No. 2-3 (June-September, 2001): 275-97.
- Avi-Yonah, Reuven S.
 "For Haven's Sake: Reflections on Inversion Transactions." *Tax Notes* 95 No. 12 (June 17, 2002): 1793-9.
- Blouin, Jennifer L., Julie H. Collins, and Douglas A. Shackelford.
 "Does Acquisition by Non-U.S. Shareholders Cause U.S. Firms to Pay Less Tax?" *Journal of the American Taxation Association* (forthcoming).
- Cloyd, C. Bryan, Lillian F. Mills, and Connie D. Weaver.
 "Market Nonreaction to Corporate Inversions." *Tax Notes* 98 No. 2 (January 13, 2003a): 259-62.
- Cloyd, C. Bryan, Lillian F. Mills, and Connie D. Weaver.
 "Firm Valuation Effects of the Expatriation of U.S. Corporations to Tax Haven Countries." *The Journal of the American Taxation Association* 25 (Supplement, 2003b): 87-109.
- Collins, Julie H., Deen Kemsley, and Douglas A. Shackelford.
 "Transfer Pricing and the Persistent Zero Taxable Income of Foreign-Controlled U.S. Corporations." *The Journal of the American Taxation Association* 19 (Supplement, 1997): 68-83.
- Desai, Mihir A., and James R. Hines, Jr.
 "Expectations and Expatriations: Tracing the Causes and Consequences of Corporate Inversions." *National Tax Journal* 55 No. 3 (September, 2002): 409-40.
- Givoly, Dan, and Carla Hayn.
 "The Valuation of the Deferred Tax Liability: Evidence From the Stock Market." *The Accounting Review* 67 No. 2 (April, 1992): 394-410.
- Gravelle, Jane.
 "Anti-Tax Shelter and Other Revenue-Raising Tax Proposals." Congressional Research Services Report for Congress, RL32193. Washington, D.C., February 27, 2004.
- Grubert, Harry, Timothy Goodspeed, and Deborah Swensen.
 "Explaining the Low Taxable Income of Foreign-Controlled Companies in the United States." In *Studies in International Taxation*, edited by Alberto R. Giovannini, R. Glenn Hubbard, and Joel Slemrod, 237-70. Chicago: University of Chicago Press, 1993.
- Grubert, Harry.
 "Another Look at the Low Taxable Income of Foreign-Controlled Companies in the United States." *Proceedings of the Ninety-First Annual Conference on Taxation*, 157-75. Washington, D.C.: National Tax Association, 1999.
- Hamilton, Amy.
 "REPO Act Targets Inversions: Are Offshore Hedge Funds Next?" *Tax Notes* 95 No. 3 (April 15, 2002): 287-90.
- Hufbauer, Gary Clyde, and Ariel Assa.
 "Rules Against Earnings Stripping: Wrong Answer to Corporate Inversions." International Economics Policy Brief. No. PB03-7. Washington, D.C.: Institute for International Economics, 2003.
- Heron, Randall A., and Wilbur G. Lewellen.
 "An Empirical Analysis of the Reincorporation Decision." *Journal of Financial and Quantitative Analysis* 33 No. 4 (December, 1998): 549-68.
- Johnston, David Cay.
 "U.S. Corporations are Using Bermuda to Slash Tax Bills." *New York Times* (February 18, 2002): A1.

- Kinney, Michael, and Janice Lawrence.
"An Analysis of the Relative U.S. Tax Burden of U.S. Corporations Having Substantial Foreign Ownership." *National Tax Journal* 53 No. 1 (March, 2000): 9–22.
- Lemein, Gregg D., and John D. McDonald.
"Taxable Inversion Transactions." *Taxes* 80 No. 3 (March, 2002): 7–14.
- Mills, Lillian F., and Kaye J. Newberry.
"Do Foreign Multinationals' Tax Incentives Influence Their U.S. Income Reporting and Debt Policy?" *National Tax Journal* 57 No. 1 (March, 2004): 89–107.
- Olson, Pamela.
Testimony before the House Committee on Ways and Means on Corporate Inversion Transactions. Washington, D.C., June 6, 2002.
- Riley, H. John Jr.
"Remarks." Special Meeting of Shareholders. Houston, Texas: Cooper Industries, May 14, 2002. http://www.cooperindustries.com/inv_center/reincltr.pdf.
- Seida, Jim A., and William F. Wempe.
"Market Reaction to Corporate Inversion Transactions." *Tax Notes* 97 No. 8 (November 25, 2002): 1098–102.
- Seida, Jim A., and William F. Wempe.
"The Market's Reaction or Nonreaction to Corporate Inversions." *Tax Notes* 98 No. 8 (February 17, 2003): 1146–50.
- Thompson, Samuel. C. Jr.
"Section 367: A 'Wimp' for Inversions and a 'Bully' for Real Cross-Border Acquisitions." *Tax Notes* 94 No. 11 (March 18, 2002): 1505–48.
- U.S. Department of the Treasury. Office of Tax Policy.
Corporate Inversion Transactions: Tax Policy Implications. Washington, D.C., May, 2002.