U.S. INTEREST ALLOCATION
RULES: EFFECTS AND POLICY

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ABSTRACT

One of the important changes of the 1986 tax reform for U.S. multinationals is related to the allocation of interest expense. Prior to 1986, U.S. companies allocated domestic interest expense to the income of foreign affiliates on a non-consolidated basis according to the distribution of gross income or assets. After 1986, a U.S. multinational is required to allocate domestic interest expense on a consolidated basis according to the distribution of U.S. and foreign assets.

We analyze the impact of the new interest allocation rules on the financial and investment decisions of U.S. multinationals using data from a survey of multinationals assembled by Price Waterhouse. We find that the allocation of interest expense increases the marginal cost of U.S. debt by about 38 percent for firms with excess foreign tax credits. Our empirical tests suggest that firms have altered the location of their borrowings in response to the new rules. We also find that the requirement to allocate interest expense has a significant impact on the effective tax rate faced by U.S. multinationals. For U.S. domestic investments, the interest allocation rules increase the U.S. effective rate from 17.6 percent to 21.9 percent. The rules also increase the effective tax rates on foreign investments made by U.S. firms.

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1. **INTRODUCTION**

In 1986, the U.S. government undertook a significant reform of its income tax system. Among the many changes were those made to the tax treatment of foreign source income of U.S. multinationals. Included in the tax reform were new rules for the calculation of foreign source income, foreign tax credits and the allocation of costs between foreign and domestic sources.

One of the important changes of this reform is related to the allocation of interest expense. Prior to 1986, U.S. companies allocated U.S.-source interest expense incurred by their domestic members to the income of foreign affiliates on a non-consolidated basis according to the distribution of gross income or assets. After 1986, a U.S. multinational is required to allocate domestic interest expense to U.S. and foreign source gross income on a consolidated basis according to the distribution of U.S. and foreign assets. The intent of this and other policies directed towards the tax treatment of foreign source income was to prevent the erosion of the U.S. corporate tax revenue base that would result from multinationals shifting expense to the United States. However, by increasing the U.S. tax on U.S. source income, the outcome of these policies may have affected the competitiveness of U.S. multinationals vis-a-vis other foreign multinationals located in countries where similar rules have not been adopted.[1]

This work analyzes the impact of the new U.S. interest allocation rules on the financial and investment decisions of U.S. multinational corporations.[2] The paper is divided into four

[1]As discussed below, the U.S. allocation rules for interest deductions have raised the cost of financing operations by U.S. debt and the cost of capital for U.S. multinationals making them less competitive relative to domestic corporations.

[2]Earlier studies of the interest allocation rules include Collins and Shackelford (1992), Andrus (1988), and Froot & Hines (1994).

additional sections. Section 2 provides a background discussion of the impact of interest allocation rules on financing and investment decisions of U.S. companies. Section 3 reports the results of empirical tests regarding the impact of U.S. interest allocation rules on the financing of U.S. parent and subsidiary operations.[3] Section 4 examines the potential impact of interest allocation rules on the competitiveness of U.S. multinationals and presents calculations of effective tax rates for investments at home and abroad taking the interest allocation rules into account. Conclusions are contained in section 5.

2. **BACKGROUND**

As mentioned above, the Tax Reform Act of 1986 (hereafter, TRA'86) altered the U.S. rules for the allocation of interest to domestic and foreign source income. Underlying the interest allocation rules is the theory that the debt of multinational corporations is fungible across jurisdictions.[4] In this section, we review the law related to interest allocation, and discuss, in theoretical terms, its impact on the financing and investment decisions of U.S. multinationals.[5]

2.1 Interest Allocation Rules

The interest allocation rules contained in TRA'86 resulted in three primary changes:

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[3]Since our data comes from foreign subsidiaries of U.S. parent companies, we focus on the interest allocation rules concerning this form of foreign affiliate organization. Special rules apply to the allocation of interest expense for foreign branches.

[4]Note that full fungibility was not adopted in 1986. Debt of the U.S. group, and interest thereon, is allocated to income received from foreign affiliates even if the foreign affiliates are self-financed, i.e. the debt of foreign affiliates is disregarded.

[5]A good description of the tax law concerning the allocation of interest expense is contained in Froot and Hines (1994).

i. <u>One taxpayer concept for affiliated companies</u>:   Prior to 1986, companies in an affiliated

U.S. group could apportion interest expense between domestic and foreign sources on a separate

company basis. After 1986, U.S. multinationals are required to aggregate affiliated company

income and interest expense to calculate interest for the purpose of taxing foreign and domestic

source income. A company is affiliated to a group if 80 percent of its voting stock or 80 percent

of the total value of outstanding stock is held directly or indirectly by includible corporations.

One impact of this provision is that it is much more difficult, perhaps impossible, for parents

to avoid the allocation of interest expense to foreign source income simply by isolating debt in

a single affiliated domestic subsidiary which has no foreign source income.

ii. <u>Asset allocation</u>: Prior to 1986, multinationals had the option to allocate domestic interest

expense under either the gross income method[6] (i.e. ratable to amounts of foreign source and

domestic source income) or the asset method (assets were measured according to "fair market

value" or "tax book value").[7] Since 1986, companies must allocate domestic interest expense

according to the distribution of assets held by the parent in domestic and foreign affiliates.

Therefore the ratio of foreign assets to worldwide assets determines the percentage of interest

expense that must be allocated abroad. Domestic assets include business assets held by the U.S.

affiliated group which produce U.S. source income, while foreign assets of the U.S. affiliated

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[6]Both prior to and after 1986, interest expense on certain non-recourse debt could be allocated entirely against the income generated by the secured asset.

[7]Tax book value is generally equal to the original cost of assets less depreciation allowed for tax purposes.

group include foreign branch assets and affiliated foreign company equity (stock and accumulated earnings and profits).

iii. **The netting rule**: The netting rule is related to U.S. parent financing of subsidiary debt. The rule is intended to prevent taxpayers from replacing third-party debt of foreign affiliates with debt to the U.S. group, an otherwise available "self-help" technique for achieving worldwide fungibility. Under the netting rule, interest incurred on third-party debt issued by the U.S. members may be attributed directly to foreign source interest on debt held by the parent in affiliated foreign companies. The amount of domestic interest expense allocated to foreign source income is determined by the relationship of debt as a ratio of assets for the subsidiary and parent. In particular, if the parent's ratio of third-party debt to assets is more than 80 percent of the foreign affiliate group's debt/asset ratio, then the excess interest on debt will be allocated to foreign source income.[8] The netting rules have been modified fundamentally on two occasions since their original promulgation in 1987.

2.2   Tax Impact of the Interest Allocation Rules

The allocation of interest to foreign source income need not affect the amount of U.S. tax paid by the U.S. multinational. The impact depends on the position of the U.S. multinational vis-a-vis its payment of tax on foreign source income. U.S. multinationals are subject to taxation on both U.S. and foreign source income. A company is subject to U.S. taxes

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[8]This ratio test was the second iteration of the rule, since replaced by a third version which "triggers" if there has been an increase in U.S. group debt and an increase in U.S. group loans to foreign affiliates.

on actual and deemed dividends from foreign subsidiaries but is allowed a credit, subject to limitation, for withholding taxes paid and income taxes deemed to be paid with respect to these dividends. If the foreign tax credit is less than the U.S. tax on remitted income, the U.S. multinational will pay U.S. tax equal to the difference between the two amounts. This is the so-called "excess limitation" case.[9] If the potential foreign tax credit is more than the U.S. tax liability, there is no U.S. tax owing on foreign source income.[10] In this case, the multinational is in an "excess credit" position because it has more available credits than it can use in a given year.

The foreign tax credit thus is limited to the lesser of foreign income tax paid on foreign source income (in the "excess limitation" case) or U.S. tax due before credit (in the "excess tax credit" case). As a result of this limitation on the use of foreign tax credits, the interest allocation rules may have an important impact on a U.S. multinational depending on its foreign tax credit position. In particular, when the U.S. multinational is in an excess limitation position, the interest allocation rule has no impact on the U.S. company. Although allocated U.S. source interest may decrease foreign source income, the reduced U.S. tax liability on foreign source income compensates for the increased U.S. tax liability on domestic source income. However, when the company is in an excess credit situation, the allocation of U.S. source interest expense

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[9]Alternatively, this is called the deficient tax credit case.

[10]Foreign tax credits can be carried back for two years and carried forward for five years. However, under current U.S. tax law, unused credits are not carried forward at a rate of interest.

to foreign source income decreases the U.S. tax paid on foreign source income (the limitation) and thus increases the amount of tax paid on domestic source income.[11]

This argument can be presented more formally as follows. Let t^*F^* be foreign tax paid at the rate t^* on foreign source income defined by the foreign authority (F^*).[12] Let tF be the U.S. tax paid at the rate t on foreign source income F as defined under U.S. rules. As discussed above, the U.S. multinational is given a foreign tax credit equal to the lesser of t^*F^* or tF. Further, let D be domestic source income (before the deduction of interest) and I be U.S. source interest expense.

When the company is in excess limitation, it receives a foreign tax credit of t^*F^* and its aggregate tax on domestic and foreign source income without interest allocation is the following:

$$T = t(D-I) + tF - t^*F^*$$
$$= t(D+F-I) - t^*F^* \tag{1}$$

When interest is allocated abroad, a portion is deductible against domestic source income and the balance against foreign source income as defined by the U.S. authorities (note only the U.S. tax liability, not the foreign tax paid to other authorities, is affected by the amount of interest allocated abroad). Let a be the portion of interest expense allocated to foreign source income. Thus, for excess limitation corporations, total tax paid with interest allocation remains constant:

$$T = t[D-(1-a)I] + t(F-aI) - t^*F^*$$

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[11]This loss of foreign tax credits may only be temporary due to credit carryforwards. However, since foreign tax carryforwards do not earn interest they are worth less than foreign tax credits that can be claimed either in the current period or through carrybacks.

[12]Under U.S. rules, companies pool sources of foreign income into "baskets". Thus, t^* may be thought of as an average tax rate imposed on aggregate foreign source income in the basket in question.

$$= t(D+F-I) - t^*F^* \tag{2}$$

The allocation of interest increases U.S. tax paid on domestic source income (by the amount taI) in favor of a reduction in U.S. tax paid by the same amount (taI). Thus, as long as the U.S. multinational maintains its excess limitation position after the allocation of interest, there is no impact of interest allocation on the tax paid by the parent company.

On the other hand, if the U.S. multinational is in an excess credit position, the foreign tax credit is limited to the U.S. tax on foreign source income, tF. The amount of tax paid, without allocation of interest, is the following:

$$T = t(D-I) + tF - tF = t(D-I) \tag{3}$$

With the allocation of interest expense to foreign source income, the U.S. company's tax liability will be the following:

$$T = t[D-(1-a)I] + t(F-aI) - t(F-aI)$$
$$= t[D-(1-a)I] \tag{4}$$

Effectively, the role of the interest allocation rule is to reduce the amount of U.S. interest expense that corporations in excess credit positions can deduct against total income.[13]

To what extent do interest allocation rules impact on the taxes paid by multinationals? Earlier work by Hines and Hubbard (1990) and Altshuler and Newlon (1993) suggest that many

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[13]Note that if the U.S. government gave a refundable tax credit when foreign taxes are more than U.S. tax liabilities on foreign source income, then the allocation rule would have no impact on the amount of tax owing. Allocated interest expense would reduce U.S. tax liabilities and increase the amount of the tax refund. Of course, the U.S. government does not give a refund for excess foreign taxes paid in order to protect its revenue base and avoid subsidizing high tax rates in foreign countries.

U.S. multinationals were in excess credit positions in the mid-1980s.[14] Thus, interest allocation rules would be expected to have at least some effect on U.S. companies.[15]

Almost all of the 17 large multinational companies surveyed by Price Waterhouse for this project reported that the interest allocation rules had at least some impact on their decisions.[16] Twelve companies reported that the "one taxpayer" rule had a major impact while three companies reported a moderate impact. The asset-apportionment rule had a major impact on nine companies and a moderate impact on five companies. The netting rule had a major impact on two companies, a moderate impact on three companies and no impact on eight companies. Thus, the "one taxpayer" and asset-apportionment rules were the most important in their impact on the surveyed multinationals.

2.3   Impact on Behavior

There are a number of expected effects of the interest allocation rules on the behavior of the U.S. multinational when it is in the excess tax credit case. One obvious impact of the new rules is for the U.S. multinational to reduce U.S. interest expense to mitigate the direct effects of interest allocation. This can be achieved in a number of ways, including substituting preferred equity for debt, deconsolidating highly leveraged domestic subsidiaries, and reducing parent debt.

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[14]Hines and Hubbard (1990) present statistics on foreign tax credit positions of U.S. multinational corporations using tax return information from 1984. Altshuler and Newlon (1993) calculated foreign tax credit positions using similar data from 1986.

[15]It is more likely that multinationals will find themselves in excess credit positions after 1986 since TRA'86 lowered the statutory U.S. tax rate from 46 to 34 percent.

[16]Section 3 contains a description of the dataset assembled from this survey.

Alternatively, the U.S. multinational can shift financing offshore by reducing debt of the U.S. group and increasing borrowing by foreign affiliates. Moreover, since only the equity held by foreign affiliates is included in the allocation formula, a shift to foreign debt reduces the percentage of remaining interest expense allocated to foreign source income.[17] At the same time, a shift to debt held by subsidiaries reduces foreign source income and corporate taxes paid to foreign jurisdictions. Depending on corporate tax rates, interest rates, and other factors, this may result in the multinational moving from an excess tax credit position to an excess limitation position so that interest allocation rules no longer matter (although should such a shift occur, the multinational pays some U.S. tax, in excess of foreign tax credits, on foreign source income).

There are, however, other expected effects on behavior. One important impact would be on investment. More U.S interest expense is allocated to foreign source income when the subsidiary undertakes new investments abroad. Thus, interest allocation can increase the effective tax rate on foreign investments. Similarly, foreign subsidiaries can divest ownership of assets and reduce the amount of allocated interest expense.

Increased capital investment in the U.S. also reduces the amount of interest expense allocated abroad. However, to the extent that the U.S.-located investment must be financed in part by U.S. debt, the interest allocation rules will increase the effective tax rate on U.S. investments as well (see the technical appendix).

In the next section, we test the impact of interest allocation rules on the financing of U.S. multinational operations. In section 4, we measure the impact of interest allocation rules on the

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[17]Note, however, that assets rather than equity are used for allocating interest expense for branches. Even foreign corporations operating in the U.S. with branches must allocate U.S. interest expense abroad in calculating U.S. tax liabilities.

effective tax rates for domestic and foreign investments made by U.S. companies and compare these to alternative policies for the tax treatment of U.S. interest expense.

3. **EMPIRICAL RESULTS**

The previous section discusses the impact of the 1986 changes in the interest allocation rules on the investment and financing decisions of U.S. multinational corporations. The theoretical model developed in the technical appendix shows that the interest allocation rules raise the cost of financing operations by U.S. debt for multinationals in excess credit positions. This increased cost of U.S. debt provides multinationals with incentives to alter their financial structure and investment decisions. Collins and Shackelford (1992) provide evidence that firms increased their issuance of preferred stock in response to TRA'86. Froot and Hines (1993) provide preliminary evidence that the new interest allocation rules have reduced borrowing and investment by multinationals in excess credit positions. In this section, we use data from the Price Waterhouse survey mentioned above to explore the possibility suggested by the theory that multinationals have substituted borrowing abroad for U.S. debt. In addition, we investigate whether the 1986 changes in the interest allocation rules have led to lower overall debt levels for the multinationals in our sample.

3.1 Data description

Data on the location of the debt of U.S. multinationals is extremely difficult to obtain. Although data from Compustat does contain some information on the foreign operations of corporations, the Geographic Segmental File of Compustat does not report information on debt

held abroad in foreign affiliates.[18] Information from tax returns is difficult to access and is not adequate for our project. The information returns filed by controlled foreign corporations (Form 5471) do contain some balance sheet information. However, information on the ratio of foreign to worldwide assets (which is necessary to calculate the percentage of U.S. interest expense that must be allocated abroad) and foreign to worldwide debt (which is necessary to determine the impact of the tax rules on the location of borrowing) is not available from tax return data.[19]

We were able to obtain much of the information necessary for our analysis from a survey of U.S. multinationals organized by Price Waterhouse. The survey contains information from corporate tax returns, subsidiary information returns and annual reports. The information from corporate tax returns allows us to calculate foreign tax credit positions. The data from the annual reports provides us with a breakdown of U.S. and foreign debt and assets. In addition, the data from the subsidiary information forms allows us to calculate debt to asset ratios for operations in three countries: Canada, Japan and the U.K. The data appendix contains a detailed description of the dataset.

The drawback of this dataset is its size. The survey was sent to 25 multinational corporations. Only 13 parent corporations in the non-financial sector returned the survey to Price Waterhouse and only four years of data are available: 1986, 1988, 1990 and 1991.[20]

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[18]In addition, for many corporations the few foreign variables that are reported are aggregated by geographic region.

[19]This is the case either because the data in question is not reported on the tax and information returns or is not recorded on the dataset assembled from the tax and information returns.

[20]Since financial corporations generally face different tax rules we eliminated them from our analysis. This reduced the sample from 17 to 13 corporations.

However, since the interest allocation rules that we are interested in studying did not take effect until after 1986, we can use this dataset to study how the financial structure of parents and subsidiaries has changed since 1986.

Table 1 presents some summary statistics taken from annual reports for the 13 non-financial corporations in our sample. As mentioned above, these firms are extremely large in terms of asset size --- in 1991, they reported average worldwide assets of 67 billion dollars (68 percent of which were U.S.). Worldwide debt to asset ratios range from about 21 percent in 1986 to about 36 percent in 1991. U.S. debt to asset ratios were quite similar ranging from approximately 20 percent in 1988 to 36 percent in 1991. An increasing fraction of the pre-tax income of these firms is from foreign sources: from 55 percent in 1986 to 83 percent in 1991.[21] Tax payments on worldwide income averaged about 1 billion per year while U.S. tax payments averaged about 325 million per year over the sample period. Finally note that the U.S. interest expense of our sample firms more than doubled from 1986 to 1991. During the same time, worldwide interest expense tripled. The remainder of this section explores the extent to which the new interest allocation rules have contributed to this trend.

3.2   The Geographic Distribution of Borrowing after TRA'86

We start by calculating the foreign tax credit positions of the 13 non-financial corporations in the dataset. Since the interest allocation rules only affect those multinationals in excess credit positions, it is natural to separate the firms by credit position and look for differences in financial structure after 1986. Over 60 percent of the firms were in excess credit

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[21]Pre-tax income is net of interest expense.

positions in each sample year. Nine firms in 1986 and eight firms in 1988 were in excess credit positions. In 1990, nine firms had excess credits and by 1991 there were ten firms with excess credits.

We also looked at the extent to which parent corporations in our sample remained in the same credit position for all four sample years. All of the parent corporations were in excess credit positions for at least one sample year and only two firms were in excess limitation positions for three of the four years. The remaining eleven firms are partitioned as follows: three were in excess credits for all four years and the remaining eight spent either two or three years in excess credits.[22] This distribution suggests that all of the firms in our sample were impacted by the changes in the interest allocation rules.

Table 2 presents foreign subsidiary and parent specific debt and asset information averaged over the four sample years. Our theory predicts that multinationals with excess credits should have lower levels of U.S. debt and higher levels of foreign debt relative to worldwide debt than those in excess limitation positions. This table presents some supportive evidence. To construct the table we first calculated the average proportion of total debt accounted for by debt in the U.S., Canada, Japan, and the U.K. for all of the firms in the sample. We then partitioned the data by credit states: all observations associated with parents in excess credit (limitation) positions are averaged separately. Unfortunately, only eight of the thirteen non-financial corporations reported information on U.S. debt.

Table 2 shows that U.S. debt accounts for almost three-quarters of worldwide debt (71.9 percent). The three countries for which data were available make up, on average, from 7.5

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[22]Six spent three years in excess credits and two spent two years in excess credits.

percent (Japan) to 11.5 percent (U.K.) of overall debt. These country-specific averages show an interesting pattern. U.S. debt makes up a lower proportion of overall debt for parents with excess credits. Similarly, these parents hold a higher proportion of debt in each of the three countries than those parents in excess limitation positions.[23] Although these results are consistent with the predictions of our model, they do not offer conclusive evidence of an impact of interest allocation rules on financial behavior. The results may simply be due to a positive correlation between excess credit status and assets abroad --- in other words, firms with excess credits may have higher levels of assets and debt abroad for reasons that are not related to interest allocation.

Table 2 also presents statistics on the ratio of foreign assets net of foreign debt (FA) to worldwide assets net of foreign debt (WWA) used to determine the proportion of U.S. interest expense that must by allocated abroad. Foreign debt is calculated by subtracting U.S. debt from worldwide debt. Therefore we can only calculate this ratio for the eight firms in our sample that reported figures for U.S. debt. The average value of FA/WWA for all firms is almost 35 percent. Parents with excess credit tend to have a higher fraction of assets located abroad --- about 38 percent.[24] This suggests that an additional dollar of U.S. interest generates a deduction of 62 cents for these firms.

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[23]The difference between the means for the parents in the two credit positions was statistically significant at a ten percent confidence level for debt in U.K. as a fraction of worldwide debt and the sum of debt in the three countries as a fraction of worldwide debt.

[24]The difference in means of FA/WWA for the parents in the two credit positions was statistically significant at the ten percent level.

The last row of table 2 contains a rough estimate of the average cost of interest allocation over the sample period. To calculate this figure we multiplied reported U.S. interest expense by FA/WWA for each observation with excess credits. The resulting dollar amount represents the effective loss of interest deductions in the U.S.[25] We find that the average cost of interest allocation for firms in our sample is about 402 million dollars per year. Multiplying by a combined federal and state corporate statutory rate of 0.38 gives an average increase in tax payments of 153 million dollars per company.[26] This represents 50 percent of average U.S. tax payments, per company with excess credits, over the four sample years.

Averaging over the four years of data may hide adjustments in financial structure influenced by changes in the interest allocation rules. In table 3, we contrast debt ratios for 1986 with those for 1990. The 1991 data is not used for this table since it contains only two parents in excess limitation.[27] Recall that the 1990 data contains three parents in excess limitation and is therefore better suited to our analysis.

Table 3 shows that the ratio of U.S. to worldwide debt increased from 1986 to 1990 for all parents. However, the increase in U.S. debt relative to worldwide debt was smaller for those

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[25]Recall that these allocated interest expenses are not allowed as deductions by host countries.

[26]See appendix table 1 for combined state and federal corporate statutory tax rates for the sample years. This is a rough estimate since the U.S. statutory rates varied over the four sample years. In addition, it does not take foreign tax credit carrybacks or carryforwards into account. The estimate would be lower if the firms with excess credits in our sample claimed their credit carryovers.

[27]Furthermore, only one of the two firms in excess limitation in 1991 had appropriate data to calculate the ratio of U.S. to worldwide debt.

parents with excess credits.[28] During the same time period the fraction of debt in Japan grew

for excess credit firms and decreased for excess limitation firms. The fraction of debt in the

U.K. decreased for both sets of firms but more so for those firms in excess limitation positions.

While these results are suggestive, we have not yet controlled for other factors besides interest

allocation that may explain the changes in the distribution of debt across these three countries.

We do this in the regression analysis below.

Table 3 presents an additional piece of evidence that is consistent with the hypothesis that

firms impacted by the interest allocation rules have substituted foreign debt for U.S. debt.

Notice that the ratio of foreign assets to worldwide assets has increased for excess credit

firms.[29] An increase in foreign debt would be consistent with this result.

The focus so far has been on the allocation of debt across countries. Tables 4 and 5 give

information on the capital structure of operations abroad, at home, and worldwide, and present

calculations of the growth of debt between 1986 and 1991 relative to assets in 1986. In contrast

to the previous tables, we now divide firms based on their four-year history of foreign tax credit

positions.[30] We contrast the three parents that were in an excess credit position for all four

years with the ten parents that were in an excess limitation position for at least one year.

Table 4 presents evidence that growth rates of debt at home and abroad differed for these

two groups of multinationals. The growth rate of U.S. debt relative to assets in the U.S. in

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[28]In 1990, the difference between the mean value of U.S. debt as a fraction of worldwide debt for parents in the two credit positions was significant at the ten percent level.

[29]The difference in the mean values of FA/WWA between parents in the two credit positions in 1990 was statistically significant at a ten percent level.

[30]Recall that the four sample years are not consecutive.

1986 was 31 percent for all multinationals. This rate was only 15 percent for firms in excess credits in all four years.[31] A higher cost of U.S. debt due to the interest allocation rules could be partially responsible for this result.

We next focus on the growth rates of debt abroad. The theory suggests that, *holding all other factors constant*, the growth rate of debt in each of the three countries should be higher for those firms that are always in excess credit positions. However, table 4 presents evidence that this is only the case for Japan. As mentioned above, we attempt to control for some country specific effects in our econometric work.

As is shown in the technical appendix, the interest allocation rules increase the cost of debt finance at home for firms with excess credits. Using a much larger dataset, Froot and Hines (1994) find that the change in overall debt for firms with high foreign to worldwide asset ratios is significantly less for those firms in excess credit positions than those in excess limitation positions. In table 5 we control for differences in foreign to worldwide asset ratios. Before turning to that analysis, note that table 4 provides evidence that is consistent with Froot and Hines (1994). The growth rate of worldwide debt for parents in excess credits for all four years is 11 percent as compared to the 31 percent growth rate for our alternative group of parents.[32] This difference in growth rates suggests that the interest allocation rules may have led to an increase in the use of other non-debt sources of finance.[33]

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[31]The difference in the growth rates is statistically significant at a ten percent level.

[32]The difference in growth rates is statistically significant at the ten percent level.

[33]See Collins and Shackelford (1992) for an investigation of the impact of interest allocation on the issuance of preferred stock.

Up to this point the analysis has ignored the impact of the ratio of foreign to worldwide assets on the tax advantage of U.S. debt. Recall that the increase in the cost of U.S. debt is an increasing function of the ratio of net foreign assets to worldwide assets (FA/WWA). This suggests that the interest allocation rules will have a differential impact on multinationals with high versus low ratios of foreign to worldwide assets. Table 5 presents evidence that is consistent with this prediction. We divide parents into two groups based on FA/WWA. Debt to asset ratios and growth rates of debt are then calculated separately for parents above and below the median value of FA/WWA in 1986. Parents above the median experienced significantly higher growth rates of debt in all three countries. In addition, these parents had growth rates of U.S. debt and worldwide debt that were significantly lower than those below the median.

The results presented in table 5 are quite strong.[34] As mentioned above, all of the multinationals in our sample were adversely affected by the changes in the interest allocation rules at some point during our sample period. As a result it is difficult to divide the sample based on whether the interest allocation rules are relevant. However, there is variation in the ratio of foreign to worldwide assets. Table 5 makes use of this variation and demonstrates that there is a negative correlation between growth rates of U.S. debt and FA/WWA and a positive correlation between growth rates of foreign debt and FA/WWA.

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[34]The difference in mean growth rates of debt for parents with FA/WWA above and below the median was statistically significant at the ten percent level for U.S. and worldwide debt.

3.3   Regression Analysis

. In the regression analysis that follows we treat the country data reported for subsidiaries

located in Canada, Japan and the U.K. by each parent corporation as an observation. This

means that for each year there are three observations for every parent. Since there are eight

parents with information on FA/WWA, three countries and four years, this procedure leaves us

with 96 observations (=8*3*4).[35]

In this section, we attempt to measure the impact of the interest allocation rules on debt

levels abroad. Our theoretical model suggests that for parent corporations with excess credits

the percentage of overall debt held in a particular host country should be an increasing function

of FA/WWA, all else equal. This ratio should have less of an impact on the debt location

decisions of parents in excess limitation.[36]

As explained in the technical appendix, host country borrowing may also be sensitive to

differences between home and host country tax rates and nominal interest rates. A marginal

dollar of debt at home lowers the tax bill in country j by $i_j u_j$ where i_j equals the nominal interest

rate and u_j is the corporate statutory tax rate in country j.[37] The same increase in debt at home

decreases taxes in the U.S. by iu where i is the nominal interest rate and u is the corporate

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[35] By treating the data in this way, we are assuming that each parent has only one subsidiary
in each of the three countries for which data is reported. In fact, the parent companies were
asked to aggregate information from their ten largest subsidiaries in each of the three countries.

[36] The interest allocation rules may impact excess limitation firms that expect to transit to
excess credit positions.

[37] The true cost of debt finance in a foreign country is $d_j = i_j(1-u_j) - \pi_j$ with π_j denoting the
rate of inflation. If it is assumed that real interest rates are the same across countries, then $i_j - \pi_j = r$ for all countries. By substitution, we obtain $d_j = r - i_j u_j$. Subtracting this expression
from a similar one obtained for the U.S., we obtain the expression $i_j u_j - iu$.

statutory tax rate in the U.S. This intuition suggests that local borrowing in host country j should be an increasing function of $i_j u_j - iu$. This relationship does not hold for multinationals that are not tax paying either at home or abroad, however. Consider a parent corporation that has a zero tax bill in host country j. Additional interest deductions have a tax value that is less than $i_j u_j$ since interest deductions are only written off when the firm becomes tax paying through carryforward provisions. The present value of interest deductions is also less than iu for parents that do not pay taxes at home due to losses. This suggests that we should treat parents with losses at home and/or abroad differently in our regression equation.[38] We do this by calculating the following explanatory variable for each country-specific observation of parent k:

$$\text{Benefit}_{k,j} = u_j i_j (1-T_{k,j}) - ui(1-T_k)$$

where[39]

j   =   subsidiary location subscript (j=Canada, Japan, or the U.K.),

k   =   parent subscript,

u_j =   the overall corporate tax rate in country j,[40]

i_j =   the nominal interest rate in country j,[41]

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[38]Since we do not have information on tax loss carryforwards of the parent corporations at home or of subsidiaries abroad, we treat losses as if there were no carryover provisions. This is equivalent to assuming that losses cannot be carried back and carryforwards expire unused.

[39]For simplicity, we suppress subscripts for time.

[40]The overall foreign and U.S. corporate tax rates are inclusive of state and local taxes. The rates used in the regressions are presented in the data appendix.

[41]The nominal interest rates are taken from OECD (1992). Appendix table 1 reports these rates for the four sample years.

$T_{k,j}$ = a dummy variable that takes the value of 1 if taxes paid in country j by subsidiaries of parent k are less than or equal to zero and takes the value of 0 otherwise,

u = the overall corporate tax rate in the U.S.,

i = the nominal interest rate in the U.S.,

T_k = a dummy variable that takes the value of 1 if taxes paid in the U.S. by parent k are less than or equal to zero and takes the value of 0 otherwise,

Note that the benefit variable takes into account changes in statutory tax rates and exchange rates (resulting from shifts in anticipated inflation rates across countries). These factors influence debt decisions in addition to the interest allocation rules.

We start by estimating the following equation:

$$D_{k,j}/WWD_k = \beta_1 Benefit_{k,j}(EC_k) + \beta_2 Benefit_{k,j}(1-EC_k) + \beta_3 EC_k$$

$$+ \beta_4 FA_k/WWA_k + \beta_5 (FA_k/WWA_k)(EC_k) + \beta_6 NMAN_k + \epsilon \qquad (5)$$

where

$D_{k,j}$ = debt holdings of subsidiaries located in country j remitted to parent k,

WWD_k = worldwide debt of parent k,

EC_k = a dummy variable that takes the value of 1 if parent k is in an excess credit position and zero otherwise,

$Industry_k$ = a set of industry specific variables for parent k, and

ϵ = an error term.

For expositional ease, we suppress parent subscripts in the following discussion.

The industry variable in equation (5) is designed to control for factors explaining debt location decisions that differ across industries. In our regressions we use a dummy variable, NMAN, that takes the value of one if the parent company is in the non-manufacturing sector and zero otherwise. This specification is meant to capture differences in the riskiness of foreign debt for manufacturing and non-manufacturing firms.

This formulation allows us to distinguish between the impact on D_j/WWD of the interest allocation variable, (FA/WWA)(EC), and FA/WWA. In addition, equation (5) takes into account that the tax benefit term may have a different impact on firms depending on their foreign tax credit status. Recall that firms in excess credit positions do not pay U.S. taxes on foreign earnings. Higher deductions in countries with corporate tax rates that exceed U.S. tax rates could decrease worldwide taxes. This points to a positive relationship between the tax benefit variable and the dependent variable for firms in excess credit positions. However, this is not necessarily the case for firms in excess limitation positions. Consider the tax bill of a subsidiary of a parent in excess limitation located in a high tax country. An increase in interest deductions will decrease foreign after-tax income and foreign tax credits which would no longer be used to shelter other sources of low-tax income being remitted to the U.S.[42] This argument points to a negative relationship between Benefit and D_j/WWD for parents in excess limitation positions.

Table 6 contains our regression results. The first column reports the coefficients for equation (5). Neither the EC dummy variable or the interest allocation variable are statistically

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[42]This argument depends on the ability of U.S. multinationals to average high and low tax income for the purpose of the foreign tax credit. For a theoretical derivation of the debt decision in the case of excess limitation, see Hines (1992) and Leechor and Mintz (1993).

significant.[43] At the same time, the FA/WWA variable is significant. The coefficient on

FA/WWA indicates that a ten percent increase in FA/WWA would lead to a .048 increase in

foreign subsidiary debt relative to worldwide debt. This is quite large relative to the mean value

of .105 for D_j/WWD. Notice also that the benefit variables are significant and have the

predicted signs.[44]

The remaining columns in table 6 contain the results of a series of revisions to equation

(5). In column (2) we experiment with a specification that allows FA/WWA to impact the local

borrowing decisions of subsidiaries with parents in both credit positions. All of the variables

in this equation are statistically significant different from zero at the ten percent level or lower.

These results suggest that the interest allocation rules are important to the local borrowing

decisions of all subsidiaries regardless of the credit position of the parent.[45] Given that all of

the subsidiaries in our sample were associated with parents that were in excess credits for at least

one year, this result is not surprising. On the other hand, there could be other factors besides

the interest allocation rules that lead to a positive correlation between FA/WWA and local debt.

Our last specification replaces current with lagged values of FA/WWA since this variable

may not be exogenous to decisions concerning the location of debt. The results in column (3)

are similar to those discussed above. The benefit variables are no longer significant and have

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[43]These results could be driven by the fact that 73 percent of the observations are associated with parents in excess credits.

[44]Also note that the coefficients are quite large.

[45]To interpret these results, consider a ten percent increase in FA/WWA. For parents in excess credit (limitation) positions, this increase would lead to a .053 (.057) increase in the ratio of foreign subsidiary debt to worldwide debt. This is quite large in relation to the average value of .117 (.068) for D_j/WWD for subsidiaries with parents in excess credits (limitation).

smaller coefficients than those in columns (1) and (2). The interest allocation variable is significant for subsidiaries with parents in both credit states. However, consistent with the theory, the coefficient on FA/WWA is larger for subsidiaries associated with parents in excess credits.

Our work with the Price Waterhouse survey supports the following conclusions:

i. The growth rate in foreign debt as a percentage of worldwide debt differed for firms in the two foreign tax credit positions. The sum of debt in Canada, Japan, and the U.K as a proportion of worldwide debt was 8.7 percent for firms with excess credits in 1986. By 1990, debt in these three countries as a proportion of worldwide debt had increased by 25 percent for firms with excess credits. For firms in excess limitation positions, the proportion of debt in the three countries in our sample decreased by 52 percent from 1986 to 1990. This suggests that the firms in our sample have altered the location of debt in response to TRA'86.

ii. The effect of the interest allocation rules on U.S. debt to asset ratios is strongest for those multinational corporations with high foreign to worldwide asset ratios. The growth in U.S. debt between 1986 and 1991 relative to U.S. assets in 1986 was 15 percent for those corporations with high foreign asset to worldwide asset ratios in 1986. The growth rate of U.S. debt for firms with low foreign to worldwide assets ratios in 1986 was 39 percent. This also suggests an impact of the new interest allocation rules on the location of borrowing.

iii.   As explained in the text, firms with excess credits lose a dollar's worth of interest deductions for every dollar of U.S. interest expense abroad. We find that this allocation of interest expense increases the marginal cost of U.S. debt by about 38 percent for these firms. We estimate that the interest allocation rules increased the U.S. tax payments of firms with excess credits by about 50 percent.

These results suggest that the new interest allocation rules have distorted the financing decisions of U.S. multinationals. Without taxes, firms issue debt in countries to minimize the cost of funds including bankruptcy and transations costs. With the new interest allocation rules, at least for the firms in our sample, this choice is distorted. This distortion induces a potentially large efficiency cost.

4.   THE IMPACT OF THE INTEREST ALLOCATION RULES ON COMPETITIVENESS

With global economic integration, the impact of government tax policies on the ability of U.S. multinationals to compete in domestic and foreign markets is an important consideration for tax policy analysis. To determine the impact of interest allocation rules on competitiveness, we estimate the effect of these rules on the effective tax rate of foreign or domestic investments undertaken by U.S. multinationals. These comparisons also allow one to examine the impact of interest allocation rules on the competitiveness of U.S. and foreign firms, assuming that the firms have similar investment projects and debt/equity ratios. Foreign multinationals operating in either the United States or their own country are less likely to face restrictions on their ability

to deduct interest incurred to finance domestic or foreign investments.[46] Thus, the effective

tax rate for foreign firms would be the one calculated for the "no interest allocation" case.

The effective tax rate that is measured below is the amount of corporate tax paid on

income generated by the last unit of, or marginal, investment made by the U.S. company at

home or abroad[47]. It is a summary measure that takes into account various tax provisions that

affect the cost of capital such as the corporate income tax rate, depreciation allowances and, in

this paper, interest allocation rules. For example, suppose that the required net-of-tax rate of

return on capital for international investors is 6 percent. A corporation that offers a net-of-tax

rate of return on capital below 6 percent would not be able to obtain financing. Suppose further

that the effective tax rate on the return on capital is 40 percent. For a U.S. corporation to

attract financing for a marginal project, it must earn a before-tax rate of return of capital at least

equal to 10 percent for international investors to earn a rate of return on capital equal to 6

percent, net of taxes. Therefore, the effective tax rate on marginal investments is indicative of

how much the tax system can affect the investment decisions of a firm.

In the attached technical appendix, we derive expressions for the effective tax rate on

U.S. domestic and foreign investments in the presence of interest allocation rules. It is assumed

that the U.S. multinational is in an excess tax credit position so that interest allocation rules

would reduce the amount of U.S.-source interest expense that can be taken against domestic

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[46]United States, similar to a number of other jurisdictions such as Germany and Canada, has a "thin capitalization" rule that restricts the ability of a foreign-owned corporation to deduct interest expense against U.S. taxable income when debt deductions surpass a certain limit.

[47]The methodology follows Boadway, Bruce and Mintz (1984) for an open economy. A similar methodology may be found in King and Fullerton (1984), Auerbach (1983) and more recently Bovenberg et al (1990) and OECD (1991).

income. We also assume in the model that the U.S. parent or subsidiary operating in a foreign country invests in depreciable capital (machinery and buildings) using either equity (retentions or new equity) or debt as finance. Debt is assumed to be fungible across countries; however, the parent and subsidiary bonds are not perfect substitutes as there are country-specific transaction and bankruptcy costs that affect corporate bond rates. Inflation rates differ across countries which in turn influences the appreciation or devaluation of the exchange rate of a country relative to that of the United States.

The estimates of effective tax rates are based on 1993 tax provisions, interest and inflation rates in the United States, Canada, Japan and the United Kingdom (see the data appendix for further details on parameters). The amount of U.S. interest allocated to foreign sources is taken to be 34.6 percent, based on the average amount of interest allocated by the non-financial companies in our data set.

In Table 7, we provide estimates of effective tax rates on U.S. multinational investments that are made in either the United States, Canada, Japan or the United Kingdom. In the first column, we calculate the effective tax rates assuming that interest is allocated. The second column provides the effective tax rate when interest is not allocated. The difference in the two columns is presented in the third column.

As is illustrated in Table 7, the requirement to allocate interest expense has a significant impact on the effective tax rate faced by U.S. multinationals. For U.S. domestic investments, the interest allocation rules increase the U.S. effective rate from 17.6 percent to 21.9 percent. The effect of interest allocation rules is to result in some of the interest that is used for domestic investments to be allocated to foreign income. Effectively, the U.S. multinational cannot deduct

all its borrowed financing expenses, unlike a corporation that need not allocate U.S. interest expense.

For foreign investments, the effect of the interest allocation rules is even more dramatic. The effect of interest allocation is to increase the effective tax rate on Canadian investment made by U.S. companies by almost 8 percentage points for both manufacturing and non-manufacturing companies. The effective tax rate on Japanese investment for U.S. multinationals increases from 18.0 percent to 28.3 percent. The effective tax rate on U.K. investments rises from 17.4 percent to 26.5 percent. If it is assumed that foreign firms do not allocate interest, then U.S. multinational companies are significantly disadvantaged from a tax point of view.

5.   **CONCLUSIONS**

The results of our empirical work suggest that interest allocation rules have had a significant impact on the financing of U.S. multinationals. Parents have reduced debt finance in the U.S. in favor of debt financing of foreign affiliates. We also find that the interest allocation rules have had a substantial impact on the effective tax rates of U.S. companies, particularly for foreign investments. Compared to foreign companies that do not have to allocate interest expense, U.S. companies face a tax disadvantage when undertaking new investments since some of the debt costs may not be deductible.

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TECHNICAL APPENDIX

This appendix provides the background theory needed to determine the impact of interest allocation rules on the financing and investment decisions. The model is based on a two period formulation of investment and financing decisions of the multinational. It is assumed that the multinational invests in productive opportunities in the U.S. and a foreign country (below, a * will denote foreign values). Either the parent or subsidiary may borrow debt. It is assumed that parent and subsidiary debt are not perfect substitutes or fully fungible. This assumption arises from the performance and regulation of national capital markets which result in lenders looking at the parent and foreign affiliate on their own terms even though the subsidiary may have guarantees of the parent. The implication of this assumption is that bankruptcy and other attendant transaction costs associated with debt financing depends on the parent and foreign affiliate's own leverage. In addition, the multinational pays taxes to the U.S. and foreign countries on income generated by investments. It is assumed for U.S. tax purposes that interest is allocated abroad and the multinational is in an excess credit position (as described in the text).

In the first period, the multinational invests in capital in the U.S., equal to K, and abroad, equal to K^*. It is assumed that the price of capital in each country is unity in the initial period. By investing in capital, the firm will obtain a stream of capital cost deductions that reduces the effective purchase price of capital. Let Z and Z^* be the present value of capital cost deductions in the U.S. and foreign country respectively. The tax value of capital cost deductions is uZ in the U.S. and u^*Z^* in the foreign country, u and u^* denoting the U.S. and foreign

corporate tax rates respectively. The multinational borrows funds in the U.S. equal to B and in the foreign country equal to B*.

In the second period, the multinational earns income and sells off its investment in each country. Foreign values are converted into U.S. dollars by using the exchange rate, denoted by x. The foreign currency is expected to appreciate relative to the U.S. dollar according to purchasing price parity. This implies that $x = (1+\pi)/(1+\pi^*)$, π and π^* denoting the rate of inflation in the U.S. and foreign country, respectively.

Second period returns earned on U.S. investments are equal to nominal revenues, $(1+\pi)F[K]$, net of interest expense on U.S. debt, $i[\gamma]B$, and U.S. taxes, T. The production function for output, F[K], is strictly concave. The nominal interest rate on debt, $i[\gamma]$ is a rising function of the debt-asset ratio of the U.S. parent, to be explained more fully below. In addition, the firm cashes in the value of its capital at the end of the second period. The value of the firm is the undepreciated replacement cost of capital. Letting δ denote the percentage amount of capital that has physically depreciated, the replacement price of capital is $(1-\delta)K(1+\pi)$, assuming the price of capital rises with the general rate of inflation, π.[1] Debt is also retired. A similar set of assumptions apply to the subsidiary with all values denoted by * and converted into U.S. dollars.

As for taxes paid to the U.S. government, the corporate tax base is equal to revenues net of interest expense and depreciation. Thus, the after tax revenues are equal to $(1-u)(1+\pi)F[K]$ and after tax cost of interest expense, without interest allocation, is equal to i(1-u). However,

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[1]It is trivial to allow the capital good price to rise by a rate different than the general rate of inflation. One could instead think of δ as the rate of physical depreciation net of real capital gains earned by holding the asset K.

since interest is allocated to the foreign subsidiary, only i(1-α) of interest expense is deductible from U.S. tax with a denoting the proportion of allocated interest expense based on ratio of foreign net assets to total worldwide assets of the parent: $\alpha = (K^*-B^*)/(K^*-B^*+K)$. Since we have included the present value of depreciation deductions in the first period, we note that, when the firm sells off its assets, it loses the value of the future stream of tax depreciation. Thus, the liquidating value of the firm is $L = (1+\pi)(1-\delta)K(1-uZ)$.[2]

As mentioned above, the interest rate is assumed to be a rising function of the debt asset ratio (γ) of the company. If the firm is liquidated, the value of assets is equal to K(1-uZ) (after replacement of depreciated capital with income). We therefore assume that the interest costs on debt rise depending on the ratio, $\gamma = B/K(1-uZ)$.

The multinational chooses the optimal amount of capital and debt to issue in the U.S. and foreign country to maximize the value of its investment. Letting ρ equal the shareholders' nominal discount rate, we can state the value of the firm as follows:

$$V = \frac{Y^P + xY^f}{1+\rho} - \left[K(1-uZ) + K^*(1-u^*Z^*) - B - B^*\right] \tag{1}$$

with $Y^P = (1-u)(1+\pi)F[K] -i[\gamma](1-u(1-\alpha)B +(1-\delta)(1+\pi)K(1-uZ) - B$,

$Y^f = (1-u^*)(1+\pi^*)F[K^*] -i^*[\gamma^*](1-u^*)B^* +(1-\delta)(1+\pi^*)K^*(1-u^*Z^*) - B^*$,

$\alpha = (K^*-B^*)/(K^*-B^*-K), \gamma = B/(K(1-uZ)), \gamma^* = B^*/(K^*(1-u^*Z^*))$.

The first order conditions yield the following results:

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[2]In principle, recapture of depreciation rules may result in the gain or loss to be treated as income and fully taxed rather than a reduction in a future stream of capital cost deductions. However, we are using this "static" model to capture in a simple way the dynamic one in which firms operate over a long period of time. The model outlined here provides the same results as the dynamic one.

(i)   Choice of Financing

The firm issues debt in the U.S. until the after tax cost of interest is equal to the opportunity cost of equity (ρ):

$$\rho = (i + i'\gamma)(1 - u(1-\alpha)) \quad \text{(with } i' = \partial i / \partial \gamma). \tag{2}$$

Foreign debt is issued until its after tax cost is equal to opportunity cost of equity:

$$\rho = (i^* + i^{*\prime}\gamma^*)(1-u^*) - ui(1-\alpha)^2(B/Kx). \tag{3}$$

Note that the first term is the after tax cost of debt (in absence of interest allocation). The second term is the tax savings arising from issuing debt in the foreign country rather than the United States. This term reduces the cost of debt finance in the foreign country. If all U.S. source interest in the U.S. is allocated abroad ($\alpha = 1$), then there is no advantage to issuing debt in the foreign country to reduce the impact of the interest allocation rule faced by the parent.

(ii)   The Investment Decision in the U.S.

The cost of capital for the parent's investment in the United States is the following:

$$F' = \frac{(\delta + r_f)(1 - uZ)}{(1-u)} \tag{4}$$

where $r_f = (1-\gamma)r + [\gamma/(1+\pi)]\{i(1-u(1-\alpha^2)-\pi\}$.

The cost of capital is similar to the usual one found in the literature. The only difference being that the cost of debt finance is higher resulting from the allocation of U.S. interest expense to the foreign subsidiary. If no interest is allocated ($\alpha = 0$), the U.S. company would be able to deduct the full cost of interest expense from taxable income. The term $1-\alpha^2$ reflects the overall impact of the capital investment on interest allocation. When the firm raises one unit of capital

stock, it finances investment by γ units of debt with tax relief equal to $(1-\alpha)u$. On the other hand, by increasing capital stock, the proportion of U.S. interest allocated abroad declines. The combination of the two effects results in the tax value of interest deductions being equal to $ui(1-\alpha^2)$.

(iii) The Investment Decision in the Foreign Country

The cost of capital for the foreign affiliate is determined as follows:

$$F^{*\prime} = \frac{(\delta + r_f^*)}{(1-u)}(1 - u^*Z^*) + R \tag{5}$$

where $r_f^* = (1-\gamma^*)r + [\gamma^*/(1+\pi^*)]\{i^*(1-u^*)-\pi^*\}$ and

$$R = \frac{ui\gamma(1-\alpha)^2(1-uZ)}{(1+\pi)(1-u^*)}\{1 - \gamma^*(1-u^*Z^*)\} \; .$$

The cost of capital for the foreign affiliate is adjusted by adding on the term, R, which is the interest allocation tax penalty resulting from additional capital expenditure made by the foreign affiliate. The amount of U.S. source interest that is allocated to the foreign affiliate depends on net assets of the foreign affiliate. When the foreign affiliate increases its capital expenditure, it increases U.S. interest expense allocated abroad. On the other hand, part of the foreign affiliate's capital expenditure is financed by additional debt $(\gamma^*(1-u^*Z^*) = B^*/K^*)$ which reduces the amount of allocated U.S. interest. However, given that B^* is likely less than K^*, then $R > 0$.

DATA APPENDIX

Much of the data used in this paper were assembled from a survey conducted by Price Waterhouse for this project. In the first section of this appendix we provide information on the survey data we used in the analysis. Notes on the data used to calculate effective tax rates appears in the second section.

A. The Price Waterhouse Survey

As mentioned in the paper, the survey data comes from tax forms and annual reports. The following list describes the source of the data used to construct tables 1 through 5.

1. Information from the tax form filed to claim a foreign tax credit (Form 1118).[1]

    a. Total taxable income from all sources. This variable was used to determine whether the parent corporation was taxable in the year in question.
    b. Foreign tax credit limitation.
    c. Foreign tax credit. To determine the credit position of the parent, we compared the foreign tax credit claimed to the foreign tax credit limitation. If the foreign tax credit equalled the limitation, the parent was in excess credits in the year in question.

2. Information from the information form filed for controlled foreign corporations of U.S. parent companies (Form 5471).[2]

    a. Taxes. This variable was used to determine whether subsidiaries were taxable in the year in question.

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[1]The survey requested multinationals to report information from their "primary basket." For the non-financial companies used in this study, this would be the overall basket.

[2]Price Waterhouse collected information from these forms by country. Multinationals were instructed to aggregate information for their ten largest subsidiaries if more than one Form 5471 was filed for a particular country. The multinationals were asked to provide information for Canada, Japan, and the U.K.

  b. Assets.

  c. Short- and long-term debt.

3. Information from the annual report.

  a. Worldwide assets.

  b. Worldwide debt.

  c. U.S. assets.

  d. U.S. debt.

  e. U.S. interest expense.

This information was used to calculate the ratio of foreign to worldwide assets for the purpose of interest allocation. The formula is:

$$FA/WWA = (WWA - U.S. \ assets - FD)/(WWA - FD)$$

where
FD = foreign debt
   = worldwide debt - U.S. debt,
FA = foreign assets,
WWA = worldwide assets.

B. Effective Tax Rates

  Data used for effective tax rate calculations included the following:

Corporate Tax Rates: See the table below. Includes tax rates on income at federal, state and local government levels. Primary source of information was taken from the International Bureau of Fiscal Documentation.

Tax Depreciation Rates: Data on average tax depreciation rates for machinery and structures are based on OECD (1991) (information for updating rates were taken from International Bureau of Fiscal Documentation or Mintz and Tsiopoulos (1992)). Present value calculations include adjustments for the half-year convention in Canada and United States.

Economic Depreciation Rates: Economic depreciation rates for structures are assumed to be 4% and for machinery 16% (exponential). Taken from Mintz and Tsiopoulos (1992).

Cost of Finance: Corporate long term interest rates and consumer price inflation rates were taken from IMF statistics. The real riskless cost of equity finance was assumed to be 3% in all countries. The risk component associated with equity finance was assumed to reflect "income risk". The cost of debt finance was augmented for bankruptcy costs.

Debt-Asset Ratio: Debt-asset ratio, prior to an adjustment for tax depreciation recapture (see technical appendix), was 38.4% for all investments in all countries. Taken from U.S. and Canadian data (see Mintz and Tsiopoulos (1992)).

Capital Stock Weights: Proportion of investments in structures (35%) and machinery (65%) were assumed to be the same for all countries. Data taken from Mintz and Tsiopoulos (1992) for manufacturing companies.

Appendix Table 1
Country Tax Rates and Nominal Interest Rates

	1986	1988	1990	1991
Canada				
overall tax rate	42.73	39.66	37.65	37.05
nominal interest rate	9.54	10.23	10.79	9.81
Japan				
overall tax rate	58.56	57.20	52.49	52.49
nominal interest rate	4.94	4.27	7.36	6.53
U.K.				
overall tax rate	36.25	35.00	35.00	35.00
nominal interest rate	9.87	9.36	11.08	9.92
U.S.				
overall tax rate	49.46	38.23	38.23	38.23
nominal interest rate	8.14	8.97	8.73	8.16

Notes:
1. Tax rates for Canada apply to manufacturing firms.
2. Overall tax rates include state and local taxes.
3. Long-term interest rates are reported.

40

Table 1
Annual Report Information

	Average Values (in millions of dollars)			
	1986	1988	1990	1991
Assets				
Worldwide	37,515	52,356	60,067	62,716
U.S.	21,900	37,214	40,549	42,897
Ratio U.S/Worldwide	0.58	0.71	0.67	0.68
Debt (short and long term)				
Worldwide	8,644	18,217	21,065	22,541
U.S.	7,758	6,674	11,118	15,647
Ratio U.S/Worldwide	0.85	0.34	0.49	0.65
Pre-tax Income				
Worldwide	2,409	3,399	2,835	1,559
U.S.	1,077	1,476	1,077	181
Ratio U.S/Worldwide	0.45	0.43	0.38	0.17
Income tax				
Worldwide (U.S. and foreign)	888	1,233	1,203	771
U.S. (on worldwide income)	238	432	432	196
Ratio U.S/Worldwide	0.27	0.35	0.36	0.27
Interest expense				
Worldwide	745	1,855	2,347	2,258
U.S.	647	657	1,164	1,656
Ratio U.S/Worldwide	0.82	0.33	0.46	0.68

Table 2
Summary Statistics

	Number of observations	Mean	Standard Error
$D_{U.S.}$/Worldwide Debt	84	0.719	0.020
Parents in excess credits	66	0.706	0.024
Parents in excess limitation	18	0.767	0.037
D_{Canada}/Worldwide Debt	52	0.091	0.014
Parents in excess credits	36	0.106	0.019
Parents in excess limitation	16	0.058	0.013
D_{Japan}/Worldwide Debt	52	0.075	0.013
Parents in excess credits	36	0.081	0.016
Parents in excess limitation	16	0.061	0.026
$D_{U.K.}$/Worldwide Debt	52	0.115	0.020
Parents in excess credits	36	0.138	0.028
Parents in excess limitation	16	0.064	0.015
$(D_{Canada}+D_{Japan}+D_{U.K.})$/Worldwide Debt	156	0.094	0.009
Parents in excess credits	108	0.108	0.012
Parents in excess limitation	48	0.061	0.011
FA/WWA	96	0.346	0.017
Parents in excess credits	72	0.377	0.021
Parents in excess limitation	24	0.255	0.021
FA/WWA*U.S. interest expense			
Parents in excess credits	72	$401,915	$88,916

Note: U.S. debt figures are only available for eight parent corporations.

Table 3
Pre-TRA'86 and Post-TRA'86 debt and asset ratios

			1990-1986
	1986	1990	1986
1. Debt in U.S./Worldwide debt			
Parents in excess credits	0.603	0.694	0.151
Parents in excess limitation	0.736	0.902	0.226
2. Debt in Canada/Worldwide debt			
Parents in excess credits	0.063	0.122	0.937
Parents in excess limitation	0.037	0.072	0.945
3. Debt in Japan/Worldwide debt			
Parents in excess credits	0.035	0.077	1.200
Parents in excess limitation	0.169	0.019	-0.888
4. Debt in U.K./Worldwide debt			
Parents in excess credits	0.163	0.127	-0.221
Parents in excess limitation	0.109	0.060	-0.450
5. [(2) + (3) + (4)]/Worldwide debt			
Parents in excess credits	0.087	0.109	0.253
Parents in excess limitation	0.105	0.050	-0.524
6. Foreign assets/Worldwide assets			
Parents in excess credits	0.327	0.445	0.361
Parents in excess limitation	0.328	0.277	-0.155

Table 4
Debt growth rates by foreign tax credit status

	Debt to asset ratios:		(Debt in 1991 - Debt in 1986)
	1986	1991	Assets in 1986
For all parents:			
Canada	0.19	0.44	5.77
Japan	0.43	0.47	0.57
U.K.	0.45	0.43	1.59
U.S.	0.26	0.37	0.31
Worldwide	0.24	0.30	0.26
For parents in excess credits in all four years:			
Canada	0.14	0.48	1.88
Japan	0.42	0.56	1.05
U.K.	0.62	0.53	0.31
U.S.	0.20	0.32	0.15
Worldwide	0.25	0.29	0.11
For parents in excess limitation for at least one year:			
Canada	0.21	0.42	6.94
Japan	0.43	0.44	0.41
U.K.	0.40	0.40	1.97
U.S.	0.28	0.40	0.39
Worldwide	0.24	0.30	0.31

Table 5
Debt growth rates by foreign to worldwide asset ratios

	Debt to asset ratios:		(Debt in 1991 - Debt in 1986)
	1986	1991	Assets in 1986
For parents with FA/WWA above median in 1986:			
Canada	0.16	0.29	16.05
Japan	0.30	0.48	0.84
U.K.	0.38	0.46	0.40
U.S.	0.20	0.32	0.15
Worldwide	0.15	0.21	0.13
For parents with FA/WWA below median in 1986:			
Canada	0.25	0.47	0.66
Japan	0.45	0.43	0.21
U.K.	0.28	0.28	0.02
U.S.	0.28	0.40	0.39
Worldwide	0.32	0.34	0.25

Note: The data consists of four parents with FA/WWA above the median and four below the median for 1986.

Table 6
Interest Allocation Rules and the Location of Debt

	Dependent Variable: Debt in Country j / Worldwide Debt where j = Canada, U.K. and Japan		
	(1)	(2)	(3)
Intercept	-0.0405 (0.5575)	-0.0659[+] (0.0285)	-0.0323 (0.0282)
[Benefit]*EC	1.2458[+] (0.0830)	1.2287[+] (0.7059)	0.2917 (0.8918)
[Benefit]*(1-EC)	-2.9453[+] (0.0665)	-3.1386[+] (1.5052)	-0.1822 (1.497)
EC	-0.0303 (0.6854)		
FA/WWA	0.4834[+] (0.0480)		
(FA/WWA)*EC	0.0559 (0.8258)	0.5276[+] (0.0718)	
(FA/WWA)*(1-EC)		0.5673[+] (0.1241)	
(FA/WWA)$_{lag}$*EC			0.4550[+] (0.0730)
(FA/WWA)$_{lag}$*(1-EC)			0.2984[+] (0.1323)
NMAN	-0.0855[+] (0.0184)	-0.0821[+] (0.0344)	-0.0377 (0.0395)
Adjusted R^2	.3824	.3881	.3898
F statistic	10.804	13.053	10.070
No. of observations	96	96	72

Explanatory variables are defined in the text. Standard errors are in parenthesis.
[+] indicates that the coefficient in statistically significant from zero at at least the 10 percent level of significance.

Table 7
Impact of U.S. Interest Allocation Rules on Effective Tax Rates for U.S. Multinationals

COUNTRY	(1) ETR with Interest Allocation	(2) ETR without Interest Allocation	(3) Difference (1)-(2)
United States	21.9%	17.6%	5.3%
Canada - Manufacturing - Non- Manufacturing	34.1% 41.5%	25.9% 33.9%	8.2% 7.6%
Japan	28.3%	18.0%	10.3%
United Kingdom	26.5%	17.4%	9.1%