Taxation and the optimal constraint on corporate debt finance: why a comprehensive business income tax is suboptimal

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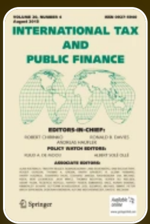

International Tax and Public Finance

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Abstract

The tax bias in favour of debt finance under the corporate income tax means that corporate debt ratios exceed the socially optimal level. This creates a rationale for a general thin capitalization rule limiting the amount of debt that qualifies for interest deductibility. This paper sets up a model of corporate finance and investment in a small open economy to identify the optimal constraint on tax-favoured debt finance, assuming that a given amount of revenue has to be raised from the corporate income tax. For plausible parameter values, the socially optimal debt-asset ratio is 2–3% points below the average corporate debt level currently observed. Driving the actual debt ratio down to this level through limitations on interest deductibility would generate a total welfare gain of about

5% of corporate tax revenue. The welfare gain would arise mainly from a fall in the social risks associated with corporate investment, but also from the cut in the corporate tax rate made possible by a broader corporate tax base.

Notes

1. The likely revenue loss has often been overstated in the debate on the ACE. According to the estimates by Mooij (2012), an ACE system would involve a budgetary cost of around 15% of current corporate tax revenue, on average for a selection of advanced economies.

2. The paper by Møen et al. (2011) studies internal as well as external debt shifting finding that a significant part of the increase in domestic corporate debt induced by a higher corporate tax rate stems from internal debt shifting by multinationals. See Schjelderup (2016) for a survey of the literature on the tax sensitivity of debt in multinational companies.

3. See Sect. 5.2.2 for an elaboration of this point.

4. For example, according to table 1 in Chen et al. (2007), the difference between the average yield on US corporate bonds with an AA-rating and medium maturity (7–15 years) and the average yield on comparable maturity treasury bonds from 1995 to 2003 was 146.27 basis points. For AAA-rated corporate bonds, the yield spread was 82.44 basis points, and for A-rated bonds, it was 177.68 basis points.

5. This value of η is higher than the user cost elasticity found in most of the empirical studies surveyed by Hassett and Hubbard (2002), but as we shall see in the next section, the quantitative results from our model are not very sensitive to the value of η.

6. To derive the optimal constraint on debt finance from formula (21) and the resulting welfare gain from formula (30), I use an iterative solution algorithm implemented in an Excel spreadsheet available on request.

7. Recall from (8) that the relationship between the cost of finance (q) and the cost of capital (c) is $c=q/\left({1-\tau } \right)$.

8. Another way of explaining the firm's preference for debt over new equity is that a manager who believes that the stock market undervalues the company's shares will want to finance new profitable investment by debt rather than new shares to avoid " giving away a free gift" to new investors.

References

Arena, Matteo P., & Roper, Andrew H. (2010). The effect of taxes on multinational debt location. *Journal of Corporate Finance*, *16*(5), 637–654.

Article Google Scholar

Boadway, R. (1987). The theory and measurement of effective tax rates. In J. M. Mintz & D. D. Purvis (Eds.), *The impact of taxation on business activity* (pp. 61–98). John Deutsch Institute for the Study of Economic Policy: Kingston, ON.

Google Scholar

Brealey, R. A., Myers, S. C., & Allen, F. (2009). *Principles of Corporate finance. Concise edition*. New York: McGraw-Hill.

Google Scholar

Chen, L., Lesmond, D. A., & Wei, J. (2007). Corporate yield spreads and bond liquidity. *Journal of Finance*, *LXII*, 119–149.

Article Google Scholar

De Mooij, R. A. (2011). *The tax elasticity of corporate debt: A synthesis of size and variations*. International Monetary Fund, Working Paper no. 11/95.

De Mooij, R. A. (2012). Tax biases to debt finance: Assessing the problem, finding solutions. *Fiscal Studies*, *33*, 489–512.

Article Google Scholar

De Mooij, R. A., & Ederveen, S. (2008). Corporate tax elasticities: A reader's guide to empirical findings. *Oxford Review of Economic Policy*, *24*, 680–697.

Article Google Scholar

Desai, M. A., Foley, C. F., & Hines, J. R, Jr. (2004). A multinational perspective on capital structure choice and internal capital markets. *Journal of Finance*, *59*, 2451–2488.

Article Google Scholar

Dimson, E., Marsh, P., & Staunton, M. (2008). *The worldwide equity premium—A smaller puzzle. Chapter 11 in handbook of the equity premium*. Amsterdam: Elsevier.

Google Scholar

ECB. (2012). Corporate indebtedness in the Euro area. *ECB Monthly Bulletin*, February 2012, pp. 87–103.

Egger, P., Eggert, W., Keuschnigg, C., & Winner, H. (2010). Corporate taxation, debt financing and foreign plant ownership. *European Economic Review*, *54*, 96–107.

Article Google Scholar

Gordon, R. H. (2010). Taxation and corporate use of debt: Implications for tax policy. *National Tax Journal*, *63*, 151–174.

Article Google Scholar

Griffith, R., Hines, J. R., & Sø rensen, P. B. (2010). *International capital taxation*.

Chapter 10 in the mirrlees review: Dimensions of tax design. Oxford: Institute for Fiscal Studies, Oxford University Press.

Google Scholar

Hassett, K., & Hubbard, R. G. (2002). Tax policy and business investment. In A. J. Auerbach & M. Feldstein (Eds.), *Handbook of public economics* (Vol. 3, pp. 1293–1343). Amsterdam: North-Holland.

Google Scholar

Huizinga, H., Laeven, L., & Nicodème, G. (2008). Capital structure and international debt shifting. *Journal of Financial Economics*, *88*, 80–118.

Article Google Scholar

Institute for Fiscal Studies. (1991). Equity for companies: A corporation tax for the 1990s, London.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*, *76*, 323–329.

Google Scholar

Jensen, M. C., & Meckling, W. H. (1976). The theory of the firm: Managerial behavior, agency costs and capital structure. *Journal of Financial Economics*, *3*, 305–360.

Article Google Scholar

Keen, M., & De Mooij, R. (2012). *Debt, taxes and banks*. International Monetary Fund (IMF), Working Paper no. 12/48.

Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., et al. (2011).

Tax by design: The mirrlees review. Oxford: Oxford University Press for the Institute for Fiscal Studies.

Google Scholar

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *32*, 1–19.

Google Scholar

Myers, S. C. (1984). The capital structure puzzle. *Journal of Finance*, *39*, 575–592.

Article Google Scholar

Møen, J., Schindler, D., Schjelderup, G., & Tropina, J. (2011). International debt shifting: Do multinationals shift internal or external debt? CESifo Working Paper No. 3519, Munich.

Norwegian Tax Reform Committee. (2014). Kapitalbeskatning i en internasjonal ø konomi (Capital taxation in an international economy). Norges offentlige utredninger 2014: 13. Oslo 2014.

Pomerleau, K. (2014). Corporate income tax rates around the world. Tax Foundation, Fiscal Fact, August 2014, No. 436.

Schjelderup, G. (2016). The tax sensitivity of debt in multinationals: A review. *International Journal of the Economics of Business*, *23*, 109–121.

Article Google Scholar

Swedish Corporate Tax Reform Committee. (2014). Neutral bolagsskatt – för ökad effektivitet och stabilitet (Neutral corporation tax - for increased efficiency and stability). SOU 2014:40, Stockholm 2014.

Sørensen, P. B. (2014). *Taxation and the optimal constraint on corporate debt finance*. Annex 3 in the report from the Norwegian Tax Reform Committee (2014).

Sørensen, P. B., & Whitta-Jacobsen, H. J. (2010). *Introducing advanced macroeconomics—Growth and business cycles* (2nd ed.). New York: McGraw-Hill.

Google Scholar

US Department of the Treasury. (1992). *Integration of the individual and corporate tax system: Taxing business income once*. Washington DC: US Government Printing Office.

Weichenrieder, A. J. & Klautke, T. (2008). *Taxes and the efficiency costs of capital distortions*. CESifo Working No. 2341.

Zangari, E. (2014). *Addressing the debt bias: A comparison between the Belgian and the Italian ACE systems*. Taxation Papers, Working Paper N. 44-2014, European Commission.

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Appendices

Technical appendix

Approximations to risk premiums

The private after-tax risk premium included in the cost of corporate finance is

$$\begin{aligned} p\left(\beta \right) \equiv \left({1-\beta } \right) p_\mathrm{e} \left(\beta \right) +\beta \left({1-\tau } \right) p_\mathrm{d} \left(\beta \right) . \end{aligned}$$

(32)

A second-order Taylor approximation of this expression around $\beta =\bar{\beta }$ yields

$$\begin{aligned} p\left(\beta \right) \approx p\left(\bar{{\beta }} \right) +\frac{\hbox {d}p\left(\bar{{\beta }} \right) }{\hbox {d}\beta }\left({\beta -\bar{\beta }} \right) +\frac{1}{2}\frac{d^{2}p\left(\bar{{\beta }} \right) }{\left({\hbox {d}\beta } \right) ^{2}}\left({\beta -\bar{\beta }} \right) ^{2}, \end{aligned}$$

(33)

where

$$\begin{aligned} \frac{{\hbox {d}p\left({\bar{\beta }} \right) }}{{\hbox

{d}\beta }}= & {} \left({1 - \tau } \right) p_\mathrm{d} \left({\bar{\beta }} \right) - p_\mathrm{e} \left({\bar{\beta }} \right) + \left({1 - \bar{\beta }} \right) p_\mathrm{e}^{{\prime }} \left({\bar{\beta }} \right) + \bar{\beta }\left({1 - \tau } \right) p_\mathrm{d}^{{\prime }} \left({\bar{\beta }} \right) , \end{aligned}$$

(34)

$$\begin{aligned} \frac{{\hbox {d}p^{2} \left({\bar{\beta }} \right) }}{{\left({\hbox {d}\beta } \right) ^{2} }}= & {} 2\left[{\left({1 - \tau } \right) p_\mathrm{d}^{{\prime }} \left({\bar{\beta }} \right) - p_\mathrm{e}^{{\prime }} \left({\bar{\beta }} \right) } \right] + \left({1 - \bar{\beta }} \right) p_\mathrm{e}^{{\prime }{\prime }} \left({\bar{\beta }} \right) + \bar{\beta }\left({1 - \tau } \right) p_\mathrm{d}^{{{\prime }{\prime }}} \left({\bar{\beta }} \right) .\nonumber \\ \end{aligned}$$

(35)

The social risk premium is

$$\begin{aligned} p_\mathrm{s} \left(\beta \right) \equiv \left({1-\beta } \right) p_\mathrm{e} \left(\beta \right) +\beta p_\mathrm{d} \left(\beta \right) . \end{aligned}$$

(36)

In the absence of tax (\(\tau =0)\), private and social risk premiums would coincide, and firms would minimize their cost of finance by minimizing the expression in (36), implying the first-order condition

$$\begin{aligned}&\hbox {d}p_\mathrm{s} \left({\bar{\beta }} \right) /d\bar{\beta } \equiv 0 \quad \Rightarrow \nonumber \\&p_\mathrm{d} \left({\bar{\beta }} \right) - p_\mathrm{e} \left({\bar{\beta }} \right) + \left({1 - \bar{\beta }} \right) p_\mathrm{e}^{{\prime }} \left({\bar{\beta }} \right) + \bar{\beta }p_\mathrm{d}^{{\prime }} \left({\bar{\beta }} \right) = 0. \end{aligned}$$

(37)

Inserting (37) into (34), we get

$$\begin{aligned} \frac{\text{ d }p\left(\bar{{\beta }} \right) }{\text{ d }\beta }\equiv -\tau a,\quad a\equiv p_\mathrm {d} \left(\bar{{\beta }} \right) +\bar{\beta }p_\mathrm {d}^{{\prime }}({\bar{\beta }}). \end{aligned}$$

(38)

Moreover, defining

$$\begin{aligned} b\equiv \frac{d^{2}p\left(\bar{{\beta }} \right) }{\left({\hbox {d}\beta } \right) ^{2}}, \end{aligned}$$

(39)

and inserting (38) and (39) into (33), we obtain

$$\begin{aligned} p\left(\beta \right) \approx p\left(\bar{{\beta }} \right) -\tau a\left({\beta -\bar{\beta }} \right) +\frac{b}{2}\left({\beta -\bar{\beta }} \right) ^{2}, \end{aligned}$$

(40)

as stated in (6) in Sect. 2. Further, by using (37), we can write the second-order Taylor approximation to the social risk premium (36) around $\beta =\bar{\beta }$ as

$$\begin{aligned} p_\mathrm{s} \left(\beta \right) \approx p_\mathrm{s} \left(\bar{{\beta }} \right) +\frac{1}{2}\frac{d^{2}p_\mathrm{s} \left(\bar{{\beta }} \right) }{\left({\hbox {d}\beta } \right) ^{2}}\left({\beta -\bar{\beta }} \right) ^{2}, \end{aligned}$$

(41)

where

$$\begin{aligned} \frac{d^{2}p_\mathrm{s} \left(\bar{{\beta }} \right) }{\left({\hbox {d}\beta } \right) ^{2}}=2\left[{p_\mathrm{d}^{\prime } \left(\bar{{\beta }} \right) -p_\mathrm{e}^{\prime } \left(\bar{{\beta }} \right) } \right] +\left({1-\bar{\beta }} \right) p_\mathrm{e}^{{{\prime }{\prime }}} \left(\bar{{\beta }} \right) +\bar{\beta }p_\mathrm{d}^{{{\prime }{\prime }}} \left(\bar{{\beta }} \right) \end{aligned}$$

(42)

From (35), (39), and (42), it follows that

$$\begin{aligned} \frac{d^{2}p_\mathrm{s} \left(\bar{{\beta }} \right) }{\left({\hbox {d}\beta } \right) ^{2}}=b+\tau \left[{2p_\mathrm{d}^{\prime } \left(\bar{{\beta }} \right) +\bar{\beta }} p_\mathrm{d}^{{{\prime }{\prime }}} \left(\bar{{\beta }} \right) \right] \end{aligned}$$

(43)

In Sect. 5.1, we introduced the second-order approximation

$$\begin{aligned} p_\mathrm{d} \left(\beta \right) \approx \frac{k}{2}\beta ^{2}. \end{aligned}$$

(44)

Using (43) and (44), we may therefore write (41) as

$$\begin{aligned} p_\mathrm{s} \left(\beta \right) \approx p_\mathrm{s} \left(\bar{{\beta }} \right) +\frac{b_s }{2}\left({\beta -\bar{\beta }} \right) ^{2},\quad b_s \equiv b+3\tau k\bar{\beta } \end{aligned}$$

(45)

Equation (45) is seen to be identical to Eq. (27) in the main text. Note from (32), (36) and (44) that

$$\begin{aligned} p_\mathrm{s} \left(\bar{{\beta }} \right)= & {} p\left(\bar{{\beta }} \right) +\tau \bar{\beta }p_\mathrm{d}\left(\bar{{\beta }} \right) \nonumber \\= & {} p\left(\bar{{\beta }} \right) +\tau \frac{k}{2}{\bar{\beta }}^{3} \end{aligned}$$

(46)

When calibrating the model, I use (46) and the specification of \(b_s \) stated in (45) to ensure consistency between the approximations made in (40), (44) and (45).

The cost of capital and its derivatives

From (4), (6), (8) and (44), one finds that

$$\begin{aligned} c= & {} \left({\frac{1}{1-\tau }} \right) \left[{r-\tau \beta \left({r+\pi } \right) +{\mathop {\overbrace{{\left({1-\bar{\beta }} \right) p_\mathrm{e} \left(\bar{{\beta }} \right) +\bar{\beta }}{(1-\tau) } p_\mathrm{d} \left(\bar{{\beta }} \right) } }\limits ^{\equiv p\left(\bar{{\beta }} \right) }}}\right. \nonumber \\&\left. {-\tau a\left({\beta -\bar{\beta }} \right) +\frac{b}{2}\left({\beta -\bar{\beta }} \right) ^{2}} \right] , \end{aligned}$$

(47)

$$\begin{aligned} \frac{\partial c}{\partial \beta }= & {} \frac{b\left({\beta -\bar{\beta }} \right) -\tau \left({r+\pi +a} \right) }{1-\tau }, \end{aligned}$$

(48)

$$\begin{aligned} \frac{\partial c}{\partial \tau }= & {} \frac{c-\beta \left({r+\pi +a} \right) +a{\bar{\beta } - 0.5k\bar{\beta ^{3}}}}{1-\tau }. \end{aligned}$$

(49)

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