Taxation and Incorporation*

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July 15, 2011

Abstract

This paper provides a theory of incorporation and taxation that emphasizes the role of the corporate legal form in facilitating access to external capital and the potential advantages of limited liability. Incorporation relaxes financing constraints and makes corporations larger than comparable non-corporate firms. For the same reason, a tax on corporations imposes a smaller first-order welfare loss than a tax on non-corporate firms. We study the consequences of tax reform and compare the role of taxation with other institutional reforms.

JEL classification: D21, G38, H25, K22
Keywords: Incorporation, corporate tax, external capital, limited liability.

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*Keuschnigg appreciates financial support from the Swiss National Science Foundation (project no. 100014_129556/1). The paper was presented at the workshop on 'Taxes and the Financial and Legal Structure of Firms' by Oxford University CBT and University of Economics in Vienna, the CESifo Area Conference in Public Sector Economics in Munich, and the workshop on 'The Role of Firms in Tax Systems' at the Ross School of Business, University of Michigan, Ann Arbor, and at the Max Planck Institute for Tax Law and Public Finance in Munich, and at the University of St. Gallen. We appreciate helpful comments by Vittoria Cerasi, Kai Konrad, Wolfgang Schön, Joel Slemrod, by seminar participants and the discussants Marcel Gerard and Jagadeesh Sivadasan.

1 Introduction

A substantial number of firms are run as sole proprietorships or non-corporate entities. They tend to be small and are typically characterized by concentrated ownership. A single entrepreneur or only a few partners make the key decisions. Larger firms, in contrast, are mainly organized as corporations and are subject to much tighter company laws, accounting standards and book keeping regulations. For these reasons, corporate firms tend to be more transparent and are more easily evaluated by external investors and other stakeholders. Obviously, the tighter reporting requirements impose extra overhead costs and make this legal form more expensive. The larger administrative costs should be justified by economic benefits of incorporation. Economists mention limited liability and improved access to the capital market as main advantages of incorporation. It is rather unclear, however, how exactly the corporate form facilitates access to external financing and how, if at all, limited liability of the owners could promote an expansion of the firm. Our paper provides a microfoundation of the decision to incorporate and analyzes welfare consequences of differential taxation of corporate and non-corporate firms.

The public economics literature has empirically analyzed the impact of taxes on the choice of organizational form (e.g., Gentry, 1994, Goolsbee, 2004, 1998, Gordon, 1998, Gordon and MacKee-Mason, 1994, 1990, MacKee-Mason and Gordon, 1997, de Mooij and Nicodème, 2008). However, this literature tends to assumes an exogenous distribution across firms of the net benefits or losses from incorporation in reduced form. The focus is typically on the use of the corporate status as a means to save taxes which leads to a larger rate of incorporation. By incorporating, entrepreneurs might be able to avoid higher personal income taxes under the sole proprietorship and instead become liable to lower corporate taxation including dividend and capital gains taxes (the importance of income shifting is emphasized, for example, in Gordon and Slemrod, 2000, and Sividasan and Slemrod, 2008). This literature does not provide a deeper structural explanation of the economic determinants of the incorporation choice.

The law and economics literature has recently emphasized the importance of legal

rules such as degrees of accounting standards, reporting requirements, bankruptcy rules, etc., on economic performance.[1] This literature is mainly empirical and has not focussed on the choice of organizational form. Closer to our analysis, Demirgüç-Kunt, Love and Maksimovic (2006) report econometric evidence that incorporation helps firms to grow larger which is consistent with our theoretical analysis. Dammann and Schündeln (2009) find for the U.S. that the quality of courts and the contents of corporate law influence firms' decisions in which state to incorporate.

The present paper explains the decision to incorporate based on recent corporate finance theory along the lines of Holmstrom and Tirole (1997) and Tirole (2006). The analysis determines the endogenous decomposition of the business sector into corporate and non-corporate form, and the relative size and other characteristics of these two types of firms. The theoretical framework formalizes two often cited advantages of incorporation: limited liability and access to external capital. Adoption of the corporate form requires implementing tighter book keeping, accounting and reporting standards which imposes an overhead cost that is absent with a sole proprietorship or partnership. The more transparent and tighter documentation leads to increased transparency for external investors and other stakeholders which limits the managerial discretion and autonomy and makes entrepreneurs more accountable. Less profit needs to be reserved for the entrepreneur to assure proper incentives which augments the firm's pledgeable income that may credibly be promised as a repayment to external investors. In turn, the entrepreneur is able to raise more external capital for any given amount of own internal funds. This formalizes the 'access to capital market' argument.

The other commonly stated advantage associated with incorporation is limited liability. Typically, entrepreneurs not only dispose of financial assets that they inject as own equity in the firm, but are also endowed with 'private' assets such as one's own family

[1]See Armour and Cumming (2008), Berkowitz and White (2004), Crawford and Freedman (2007), Djankow et al. (2002), Fan and White (2004), and La Porta et al. (1997, 1998). Spamann (2010) and Martynova and Renneboog (2009) investigate the sensitivity of results in empirical law and finance research. Bushman et al. (2004) provide an accounting perspective on corporate transparency.

house. Probably, the value of private assets is higher for the entrepreneur than for the bank because they provide an extra 'consumer surplus' (e.g., living in one's own house). We argue that banks can seize all assets of sole proprietors including private assets. In contrast, depending on bankruptcy rules, the corporate form protects a larger part of private assets on account of limited liability. We emphasize two opposing consequences of limited liability. The need to pledge all private assets sharpens incentives of sole proprietors and allows them to raise more external financing. However, entrepreneurs attach a higher value to their private assets than banks or the market do. They might thus be very unwilling to pledge private assets and to loose them in case of bankruptcy. If entrepreneurs have a sufficiently high valuation of private assets, they might want to protect them against the downside risk, even if they could serve as collateral and raise borrowing capacity. Hence, sufficiently 'risk-averse' entrepreneurs with a high personal valuation of private assets prefer to protect them and may decide to incorporate to benefit from limited liability. However, it might also be the case that incorporated entrepreneurs voluntarily offer their private assets as collateral to facilitate external financing if they are not very averse to the downside risk. Hence, the value of limited liability has an ambiguous effect on the incorporation decision of entrepreneurs.

The incorporation choice is most relevant for smaller and younger firms with concentrated ownership and a dominant role of the entrepreneur as a manager owner.[2] These are most likely to be finance constrained.[3] When investment is constrained, firms earn

[2]Our model is less suitable to explain investment and financial choices of larger and older firms with more dispersed ownership. These firms are mostly run by independent professional managers. The agency problem is typically related to dividend policy and misallocation of retained earnings rather than access to external credit. In large dividend paying firms, managers might divert free cash-flow to finance less productive 'pet projects', instead of paying out dividends (see, e.g., Chetty and Saez, 2010). Then, the choice of legal form is not really an issue, since large firms with diversified ownership are incorporated and need to disclose even more information to attract small equity investors.

[3]Beck, Demirgüç-Kunt and Maksimovic (2005, 2008) show that small firms, especially in poor institutional environments, are able to raise less external capital. As financial and institutional characteristics improve, the constraints become less tight. Small firms catch up and benefit the most. Cabral and Mata

a return in excess of the user cost of capital, indicating unexploited investment opportunities. Investment becomes sensitive to cash-flow and no longer exclusively depends on user cost. Our results show that a differential corporate tax, by eroding cash-flow, reduces investment and profits of corporate firms and, thereby, discourages incorporation. In contrast to reduced form models of incorporation choice, the tax imposes a first-order welfare loss since it further reduces investment which is already constrained a smaller than first best level. The most novel result of the paper relates to the welfare consequences of differential corporate taxation. In so far as the corporate legal form facilitates access to external capital, corporate firms are larger, financially less constrained and have a lower excess return on investment than comparable non-corporate firms. Profit taxes are thus relatively less damaging to corporate firms. As a consequence, we find that welfare is increased if the tax burden is shifted from non-corporate to corporate firms.[4] For the same reason, we find that an apparently symmetric tax treatment such as a 'check-the-box' provision, where firms can choose the most tax efficient tax schedule independent of their legal status, are generally not neutral when the choice of the legal status puts firms into a different financial regime. The same tax hits non-corporate firms with a tighter financing constraint more than less constrained corporate firms and, therefore, favors incorporation.

Apart from taxes, we discuss how institutional reforms and other economic shocks affect incorporation and welfare. Specifically, we interpret an improvement of a country's accounting and reporting standards as policy devices that facilitate access to external finance and raise the benefits of incorporation. We find that better accounting standards raise the incorporation rate, make corporate firms larger and more profitable, and boost welfare. This result is consistent with the fact that accounting standards tend to be highly significant in cross-country growth regressions and that better standards favor the expan-

(2003) explain the size distribution of firms with the existence of credit constraints. Young firms are very concentrated in small size classes while older firms are more evenly distributed.

[4]Hence, some double taxation, as under a classical system of corporate taxation, might be worthwhile in our framework if other, more direct policies are not feasible. A differential corporate tax is sometimes justified in exchange for other economic advantages of the corporate legal form, see Musgrave (1959) and Atkinson and Stiglitz (1980: 131-2) for early examples, and Kaplow (2008: 236-8) for a recent discussion.

sion of financially dependent industries (Rajan and Zingales, 1998). More relevant for our paper, Demirgüç-Kunt, Love and Maksimovic (2006) find that incorporated businesses grow larger than unincorporated firms in countries with high quality legal systems and better financial institutions. Using a German sample of firms, Haarhoff et al. (1998) also show that corporate firms grow significantly faster than others. Finally, relating to limited liability, we show that a higher value of private assets, such as housing equity, increases investment and profits. Even if corporate entrepreneurs pledge their private wealth as well, the higher collateral value tends to benefit non-corporate firms relatively more since they are more opaque and more constrained, leading to a decline in incorporation rates.[5]

The remainder of the paper is organized as follows. The subsequent section presents a stylized theoretical model of the decision to incorporate in the presence of taxes. Section 3 presents the key results by deriving the comparative statics and welfare effects of tax and institutional reforms. The last section concludes.

2 A Model of Incorporation

2.1 Overview of Model

Consider a mass one of closely held entrepreneurial firms developing a single risky project each in a two stage investment process. A firm is run by one entrepreneur. Early stage investment k is fixed and self-financed out of own assets A. Expansion investment I is variable and leveraged with external funds. The project may fail in each stage. Entrepreneurs are assumed heterogeneous in ability which is reflected in a firm specific success probability $q' \in [0,1]$ of early stage investment. This success probability is known to firms at the beginning of period, and characterizes a firm's type. The success probability of expansion stage investment is either high or low, $p > p_L$, depending on managerial effort,

[5]For instance, Chaney, Sraer and Thesmar (2010) found the investment enhancing role of collateral value to be important. According to their estimates, the sensitivity of investment to collateral value is stronger the more likely a firm is credit constrained.

but is otherwise symmetric across firms. A firm of type q' fails and closes down at the early stage with probability $1-q'$. Conditional on survival, it may fail with probability $1-p$ (or $1-p_L$) in the expansion stage. Output is produced only if both stages are successfully completed.

Let us use index n to refer to non-corporate firms and index c to corporations. The timing of events is as follows. (i) Given its type q', a firm chooses organizational form $j \in \{n, c\}$, and a fixed early stage investment k_j is sunk. The firm either fails or continues with expansion investment. (ii) After self-financing k_j, the owner is left with equity $E_j \equiv A - k_j < I_j$. To go ahead with expansion investment, banks must lend an amount $I_j - E_j$. (iii) The entrepreneur chooses effort. High effort (no private benefits) yields a high success probability p, low effort (consumption of private benefits or leisure) leads to $p_L < p$. (iv) Investment yields an end of period value $I_j + f(I_j)$ if successful, and nothing if failed. If successful, the owner pays back credit and consumes. The net output function is increasing and concave, $f'(I_j) > 0 > f''(I_j)$.

Apart from financial wealth A, entrepreneurs own a private asset (e.g., a family house). The entrepreneur's consumption value H of the private asset exceeds market valuation $L = (1-\beta) H$. Liquidation thus leads to a deadweight loss βH. We interpret the loss of consumer surplus in case of bankruptcy as downside risk-aversion.[6] The corporate form offers limited liability so that entrepreneurs can protect their private asset. As a matter of choice, they can pledge it as a collateral L_c for repayment equal to the market value in the bad state, $L_c \in \{0, L\}$ and $H_c \in \{0, H\}$. In contrast, sole proprietors, by law, are fully liable with all private wealth so that $L_n = L$ throughout. Depending on chosen organizational form, banks can get a safe repayment of L_j and can thus lend riskless debt of L_j. Given a refinancing cost equal to the deposit rate (normalized to zero), a competitive bank breaks even by charging zero interest on safe debt. After getting safe

[6] Tirole (2006, p. 170) adopts the notation $L = \beta H$, leading to a deadweight loss $(1-\beta) H$. Our notion of downside risk-aversion also follows Tirole (2006, p. 145) where agents are risk-neutral in high consumption levels but a drop in consumption below a critical value creates a discrete utility loss. In our model, the bad state leads to an additional loss of consumer surplus from loosing the private asset.

debt, the firm still needs risky debt equal to $D_j = I_j - E_j - L_j$ which can be repaid only in case of success while a failed firm is unable to repay. To cover losses from default, banks charge a higher loan rate i on risky debt. Lending an amount D_j, the bank breaks even if $p(1+i)D_j - D_j \geqslant 0$. Given a zero profit of no-arbitrage condition, the risky loan rate is

$$p(1+i) = 1. \tag{1}$$

After self-financing fixed early stage investments, firms are left with residual own funds $E_j \equiv A - k_j$ and need external funds $I_j - E_j$ to finance expansion investment. If successful, tax $T_j = t_j [f(I_j) - i(I_j - E_j + (1-\lambda)E_j)]$ is due, where only external debt is deductible if $\lambda = 1$ as in the status quo. When both debt and own equity are deductible ($\lambda = 0$ as with an 'adjusted current earnings', ACE, tax), the tax liability is $T_j = t_j [f(I_j) - iI_j]$. Since the tax distortion between debt and equity is not essential for our purposes, we assume $\lambda = 0$, which simplifies our analysis substantially. Hence, expected tax liability at the expansion stage amounts to

$$pT_j = t_j \pi_j^T, \quad \pi_j^T \equiv p[f(I_j) - iI_j]. \tag{2}$$

Noting the distinction between safe and risky debt and using $L_j = (1-\beta)H_j$, the company's surplus is divided between the owner and the bank according to

$$\begin{aligned} \pi_j^e &= p[I_j + f(I_j) - T_j - (1+i)D_j - L_j] - (1-p)H_j - E_j, \\ \pi_j^b &= p[(1+i)D_j + L_j] + (1-p)L_j - (I_j - E_j), \quad D_j = I_j - E_j - L_j, \\ \pi_j &= p[I_j + f(I_j) - T_j] - I_j - (1-p)\beta H_j. \end{aligned} \tag{3}$$

Tax T_j is due only if the company succeeds. Repayment is $(1+i)D_j$ on risky debt and L_j on safe debt. If the company fails, the bank gets repayment only on safe debt, L_j, by seizing the owner's private house with liquidation value L_j. The owner, in contrast, looses the full consumption value of her house. Liquidation of the private asset thus results in a deadweight loss βH_j when the firm fails.

Competitive banks earn zero profits. The participation constraint $\pi_j^b = 0$ implies that the entrepreneur appropriates the entire joint surplus, $\pi_j^e = \pi_j$, as long as she obtains

external financing. Using (1) and the definition of tax liability in (2) yields a surplus of

$$\pi_j = p\left[f\left(I_j\right) - iI_j - T_j\right] - (1-p)\,\beta H_j = (1-t_j)\,\pi_j^T - (1-p)\,\beta H_j. \tag{4}$$

Adding tax gives the social surplus $\pi_j^* = \pi_j + pT_j = p\left[f\left(I_j\right) - iI_j\right] - (1-p)\,\beta H_j$.

In the early stage, a firm must decide whether to incorporate or not. Firms are heterogeneous in $q' \in [0,1]$. The expected net value of a firm of type q' and organizational form j is $V_j\left(q'\right) = \pi_j q' - k_j$, where π_j is the expected net of tax value of expansion investment. It will be shown below that incorporation boosts value by improving access to capital, leading to a larger surplus from expansion investment under the corporate legal form, $\pi_c > \pi_n$. We normalize the fixed cost of non-corporate firms to zero, $k_n = 0$. The cost of incorporation is thus the *differential* fixed cost $k_c = (1-t_k)\,k$ required to install a more elaborate documentation and book keeping system. The government may finance a part $t_k k$ by allowing tax deductions.[7] As will be shown below, incorporation raises firms size and boosts the surplus, $\pi_c > \pi_n$. In consequence, less able and less successful entrepreneurs with a small expected surplus $\pi_j q'$ will not find it worthwhile to incorporate and invest the fixed cost. A firm of type q' prefers the corporate legal form whenever $V_c\left(q'\right) > V_n\left(q'\right)$, i.e., $\pi_c q' - k_c > \pi_n q'$. The cut-off value q, determined by $V_c\left(q\right) = V_n\left(q\right)$, segments businesses into two types of legal form,

$$q = (1-t_k)\,k/\left(\pi_c - \pi_n\right). \tag{5}$$

Knowing their type, firms choose the legal form. Those with good prospects $q' > q$ strictly prefer incorporation, while all others remain as a sole proprietorship. Since q is a probability, parameter k must be small enough to support an interior solution.

Firms are distributed by $G\left(q\right) = \int_0^q g\left(q'\right) dq'$. The cut-off value q yields a share n of non-corporate firms of which only $s_n < n$ survive the start-up period. Similarly, only

[7] When there is incomplete loss offset or carry forward of losses, the effective tax subsidy is smaller than the corporate tax rate t_c. When early stage losses are offset against highly taxed other wage earnings, the tax subsidy might be larger, see Gordon (1998).

$s_c < 1-n$ corporations arrive at the expansion stage. Due to business failure, $s_n + s_c < 1$,

$$s_n = \int_0^q q' dG(q') < n = \int_0^q dG(q'), \quad s_c = \int_q^1 q' dG(q') < 1-n. \tag{6}$$

The government collects taxes and is assumed to distribute a per-capita transfer z at the end of period,[8]

$$z = \textstyle\sum_j s_j t_j \pi_j^T - (1-n) t_k k. \tag{7}$$

Welfare is equal to expected end of period wealth. Firms are left with financial assets $E_j = A - k_j$ and the value H of private assets (e.g., the private home) when the start-up phase is complete. With probability q', the entrepreneur survives the early stage and enjoys expected end-of-period wealth $\pi_j^e + E_j + H$ where continuation value π_j^e is defined as a surplus.[9] With probability $1-q'$, she fails early on and is left with $E_j + H$ only. Adding transfers z, expected welfare is $W = \int_0^1 [q'\pi^e(q') + E(q') + H] dG(q') + z$, where $E(q')$ is either E_c or E_n, and similarly for $\pi^e(q')$. Substituting tax revenue z, noting $\pi_j^e = \pi_j$ with zero bank profits, and using $\pi_j + pT_j = \pi_j^*$, one can write welfare as

$$W = \textstyle\sum_j s_j \pi_j + A - (1-n)(1-t_k) k + H + z = \sum_j s_j \pi_j^* + A - (1-n) k + H. \tag{8}$$

2.2 Constrained Investment

More investment raises the firm's surplus by

$$d\pi_j / dI_j = (1-t_j)\rho_j \geqslant 0, \quad \rho_j \equiv p[f'(I_j) - i]. \tag{9}$$

At low levels of investment, the firm would generate a return larger than the loan rate i and earn an 'excess return' ρ_j. Clearly, if the firm were unconstrained, it would maximize

[8] We assume that transfers are received in the private sphere and can not be pledged by constrained firms. In reality, business taxes and transfers are paid and received by rather different groups. In Section 3.2, these transfers are set to zero.

[9] Final wealth is $I_j + f_j - T_j - (1+i) D_j - L_j + H$ in the good state of a successful continuation investment, and zero in the bad state if the private asset is liquidated.

surplus by investing until all profitable investment opportunities are exhausted and the excess return is driven to zero, $\rho_j = 0$, leading to $f'\left(I^{FB}\right) = i$. Figure 1 illustrates.[10] Investment is exclusively determined by the user cost of capital i. Here, the profit tax has no impact on investment due to our assumption of $\lambda = 0$, see the discussion prior to (2). This will no longer be the case when firms are constrained. Note, finally, that unconstrained investment is independent of organizational form. To isolate the contribution of incorporation on firm performance, we wish to keep firms identical in all characteristics other than their legal form.

External financing is often restricted by moral hazard and managerial opportunism. For bank lending to be incentive compatible, entrepreneurs must keep a high enough stake to reward effort when effort is costly in terms of foregone private benefits $\gamma_j I_j$.[11] Private benefits are assumed to rise linearly with investment. In raising the firm's success probability from p_L to p, more effort not only results in higher expected wealth but also reduces the risk of loosing the private asset. Writing the entrepreneur's surplus in (3) as $\pi_j^e = pv_j^e - H_j - E_j$, the incentive constraint requires that $pv_j^e \geqslant p_L v_j^e + \gamma_j I_j$, or $v_j^e \geqslant \gamma_j I_j / (p - p_L)$ where $v_j^e \equiv I_j + f(I_j) - T_j - (1+i) D_j + \beta H_j$ is the gain in expected surplus, including consumer rent on the private asset, when the success probability rises. Entrepreneurs must keep a minimum income $\gamma_j I_j / (p - p_L)$ to guarantee high effort. The income goint to the owner limits the firm's debt capacity. Pledgeable income is equal to the total project value net of tax, $I_j + f(I_j) - T_j$, augmented by the consumer surplus βH_j of living in one's own house (the threat of loosing it strengthens incentives), minus the incentive income $\gamma_j I_j / (p - p_L)$. Multiplying the constraint $v_j^e \geqslant \gamma_j I_j / (p - p_L)$ by p

[10] In the first-best, there is no need for pledging collateral when external funds are unrestricted. A vertical shift of the profit line by $(1-p)\beta H_j$ doesn't change the maximizer.

[11] Assuming $p_L \to 0$ excludes a viable equilibrium with low effort. The break even loan rate i_L, given by $p_L(1+i_L) = 1$, gets excessively high, leading to very small investment. The entrepeneur's surplus becomes definitely lower than in an equilibrium with high effort and a low rate i.

and using (1-4) yields[12]

$$\pi_j = (1-t_j)\,p\,(f(I_j) - iI_j) - (1-p)\,\beta H_j \geqslant \Gamma_j I_j - [A - k_j + H_j]\,, \quad \Gamma_j \equiv \frac{p\gamma_j}{p - p_L}. \quad (10)$$

When the incentive constraint is binding, investment is constrained. The left-hand side of the weak inequality in (10) corresponds to the concave curve in Figure 1 which starts at the point $-(1-p)\,\beta H_j$. The right-hand side is represented by the dashed lines. Starting with low investment levels when the constraint is still slack, the firm expands investment to boost profit until the constraint binds. At that point, the right-hand side of equation (10) grows faster with investment compared to the left-hand side. Credit rationing at $I_j < I^{FB}$ occurs when higher investment is profitable because it earns an excess return of $\rho_j > 0$, but is not possible if the incentive constraint binds.

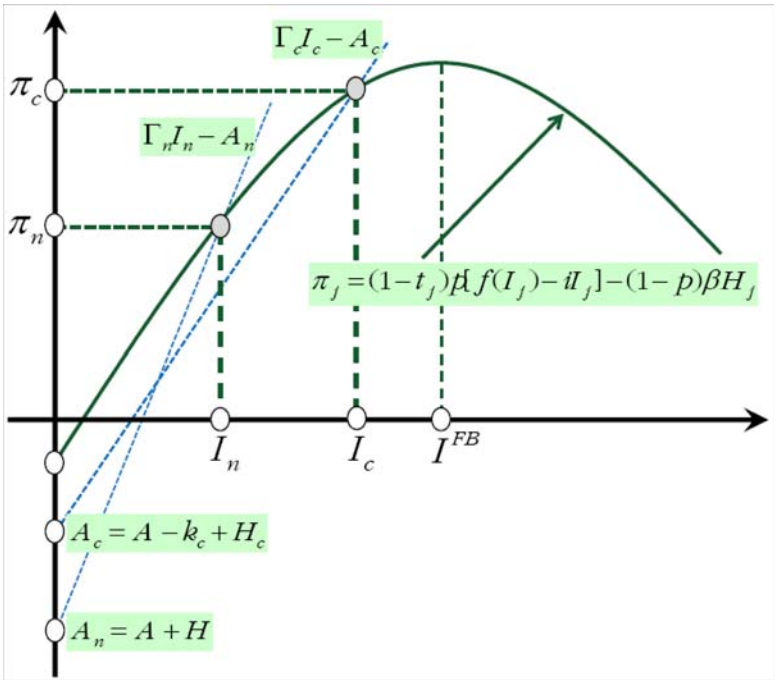


Fig. 1: Incorporation and Access to Capital

Proposition 1 ***(Credit Rationing)*** *Unconstrained investment requires* $f'\left(I^{FB}\right) = i$. *Constrained investment* $I_j < I^{FB}$ *yields an excess return* ρ_j, *where* $\Gamma_j > (1-t_j)\,\rho_j > 0$.

[12]The Appendix presents an alternative, but economically equivalent formulation which refers to the potential misuse of business assets for private benefits. Our results do not depend on the precise cause for the existence of financing constraints.

When firms are constrained, investment is implicitly determined by the binding incentive constraint (10). Investment is sensitive to own assets or accumulated cash-flow E_j, to collateral H_j, and to governance standards as reflected in Γ_j. None of these parameters would matter in a Modigliani-Miller world. Taking the differential yields

$$dI_j = -\frac{\pi_j^T}{m_j} \cdot dt_j - \frac{I_j}{m_j} \cdot d\Gamma_j + \frac{1}{m_j} \cdot dE_j + \frac{1-(1-p)\,\beta}{m_j} \cdot dH_j, \tag{11}$$

where $m_j \equiv \Gamma_j - (1-t_j)\,\rho_j > 0$, see Proposition 1. The tax would be neutral in an unconstrained equilibrium (see the discussion following (9)), but no longer when firms are finance constrained and investment is sensitive to cash-flow. The tax does not operate via the traditional user cost channel but reduces investment because it drains internal funds. Similarly, more own equity E_j relaxes the financing constraint and boosts investment. This could be illustrated in Figure 1 by a downward shift of the incentive line $\Gamma_j I_j - E_j - H_j$. Investment also expands when the collateral value of private assets rises.

The main benefit of incorporation is better access to capital markets, i.e., external financing. Tighter book keeping and documentation imposed by the corporate legal form render firms more transparent and managers more accountable.[13] The reporting requirements thus reduce private benefits of shirking, $\Gamma_c < \Gamma_n$. In Figure 1, the incentive line of a corporate firm is, for this reason, flatter than the one of a non-incorporated firm. On the other hand, the higher fixed cost of incorporation drains internal funds. Incorporation thus raises the firm's surplus if the value-increasing effect of transparency dominates over the higher fixed cost. The surplus of a constrained firm changes by $d\pi_j = (1-t_j)\,\rho_j dI_j$. The fixed cost of incorporation drains own funds and reduces investment while a smaller agency cost resulting from higher transparency boosts investment. Starting with a symmetric situation where $\Gamma_c = \Gamma_n$ and $A_c = A_n$, and noting how investment I_c depends on

[13] Hansmann and Kraakman (2000) stress the role of a separate legal entity in partitioning of personal assets of owners from business assets. The claims of the firm's creditors have priority over the claims of personal creditors of the owners and managers. This significantly reduces transaction costs and facilitates lending since creditors need to monitor and evaluate only the firm and not the private sphere or other businesses of the owner. In our model, these savings are reflected in lower private benefits of the entrepreneur, or in reduced opportunities to divert company resources for private use as in the Appendix.

$k_c = (1 - t_k)\, k$ and Γ_c, one finds that $d\pi_c > 0 \Leftrightarrow d\Gamma_c/dk < -(1 - t_k)/I_c$. Investing in corporate transparency must result in a sufficiently large reduction of agency costs for incorporation to raise net firm value. This yields parameters $\Gamma_c < \Gamma_n$ and $k_c > 0$, such that corporate firms can raise more external funds and invest at a larger scale, $I_c > I_n$, and, for this reason, are also more profitable than non-corporate firms, $\pi_c > \pi_n$. Larger investment means that corporate firms earn a lower excess return and are less constrained than non-corporate firms.

Proposition 2 ***(Access to Capital)*** *Corporate firms are less constrained, raise more external funds, invest at larger scale, and earn higher profits than comparable unincorporated firms. Their excess return is smaller,* $\rho_c < \rho_n$.

Corporate owners enjoy limited liability and may choose whether to pledge their private asset as a collateral. When doing so, the firm is able to relax the financing constraint and to expand investment, see (11). Since a constrained firm earns an excess return, a larger investment scale boosts the firm's surplus, $d\pi_c = (1 - t_c)\, \rho_c dI_c - (1 - p)\, \beta dH_c$. On the negative side, collateralizing the private asset leads to a loss of consumer surplus when it must be liquidated in case of default. The net effect is

$$\frac{d\pi_c}{dH_c} = (1 - t_c)\, \rho_c \frac{1 - (1 - p)\, \beta}{m_c} - (1 - p)\, \beta = \frac{(1 - t_c)\, \rho_c - (1 - p)\, \beta \Gamma_c}{m_c}. \tag{12}$$

If $d\pi_c/dH_c|_{H_c = H} > 0$, the corporate owner prefers to pledge the private asset as a collateral and sets $H_c = H$, while $d\pi_c/dH_c|_{H_c = 0} < 0$ leads her to set $H_c = 0$ and deny collateral.

Proposition 3 ***(Limited Liability)*** *If firms are very constrained (large* ρ_c*) and/or owners enjoy little consumer surplus from private assets (*β *small), corporate owners prefer to pledge private assets and do not take advantage of limited liability.*

2.3 First Best

When the incentive constraint is slack, investment is first best. In Figure 1, the incentive line would cut the profit curve to the right of I^{FB}. Unconstrained firms invest according

to $f'\left(I^{FB}\right) = i$. Investment scale and gross profits are then independent of the tax rate, undistorted, and also identical for both types of legal form. The surplus $\pi_j = (1-t_j)\,\pi^T - (1-p)\,\beta H_j$ leads to an unconstrained firm's net value $V_j\,(q') = \pi_j q' - k_j$. Banks have access to private assets by law, $H_n = H$, if firms remain unincorporated. Corporate owners, in contrast, are protected by limited liability. They choose $H_c = 0$ to maximize the surplus from expansion stage investment. Offering the private asset as a collateral yields no gain in terms of facilitating investment when firms are unconstrained. It only leads to liquidation costs and an expected loss $(1-p)\,\beta H$ in the event of failure. The discrete choice condition for organizational form in a frictionless capital market is then $(\pi_c - \pi_n)\,q = k_c$, or $\left[(t_n - t_c)\,\pi^T + (1-p)\,\beta H\right] q = (1-t_k)\,k$. One may then distinguish four cases, depending on the combination of parameters H and k.

First, consider a situation where investment in corporate transparency is costless ($k = 0$, there is no reason to invest in it when there are no capital market frictions) and entrepreneurs do not have any private assets ($H = 0$). Tax neutrality towards organizational form then requires $t_n = t_c$. In this case, all firms irrespective of type q are indifferent with regard to organizational form in the absence of tax, and remain so when subject to tax. If $t_n \neq t_c$, either none or all firms choose to incorporate.

Second, if $k > 0$ and $H = 0$, no firm would ever want to incorporate in the absence of tax since it would be costly without any benefit in return. Tax neutrality in the sense of not changing the incorporation decision $q = 1$ then requires a larger tax rate on sole proprietorships, $t_n > t_c$, to compensate for the disadvantage of corporations in terms of fixed cost. But the tax rate for non-corporate firms, t_n, must also not be too large to not turn around the incorporation decision in the absence of tax, $t_c < t_n \leqslant t_c + (1-t_k)\,k/\pi^T$.

Third, if $H > 0$ and $k = 0$, then $V_c > V_n$ for all q', so that $q = 0$. Incorporation is costless and all firms incorporate in the absence of tax to benefit from limited liability under the corporate legal form and protect the private property of the entrepreneur. This corner solution is unaffected and taxes are neutral towards organizational form as long as $t_n < t_c \leqslant t_n + (1-p)\,\beta H/\pi^T$. The effective corporate tax rate, t_c may exceed the

personal tax rate to the extent that incorporation brings about the advantage of limited liability, but it must be not too large to turn around the incorporation decision.

Finally, if both H and k are positive with $(1-p)\,\beta H > k$ to assure an interior solution with some firms incorporated and others not, organizational choice in the absence of tax is given by $(1-p)\,\beta H \cdot q^{FB} = k$. Only the more successful firms, namely those ones with an early stage success probability $q' > q^{FB}$, will then find it profitable to invest in an accounting and reporting system to exploit the advantage of limited liability. This allocation can be replicated if tax rates are chosen to satisfy $(t_c - t_n)\,\pi^T \cdot q^{FB} = t_k k$ or, equivalently, $t_c = t_n + t_k\,(1-p)\,\beta H/\pi^T > t_n$. As long as $t_k > 0$ (with $t_k = t_c$ being the natural case), tax neutrality requires $t_c > t_n$. Equal tax rates, for example, would lead to excessive incorporation by reducing the cut-off value q below the first best value q^{FB}. The upshot is that even in a frictionless capital market, tax neutrality towards organizational form is not guaranteed by equal tax rates. A somewhat larger effective corporate tax rate (some degree of double taxation as under a classical system) would be required in our model to make firms pay for the advantage of limited liability under the corporate legal form.[14] Disregarding case 2 above as a degenerate case (incorporation is costly without any advantage at all), we derive the following result.

Proposition 4 ***(First Best)*** *(i) In a frictionless capital market, when there are no private assets for collateral and no fixed costs of incorporation, the tax system is neutral towards choice of organizational form if tax rates are uniform ($t_c = t_n$). (ii) If entrepreneurs are endowed with private assets and if only the corporate legal form offers limited liability, tax neutrality requires a higher effective tax rate for corporations ($t_c > t_n$).*

[14] One should add that different legal rules for limited liability across organizational forms do not make sense with a frictionless capital market.

3 Tax Policy and Institutional Reform

In the remainder of the paper, we concentrate on the case where corporate owners willingly do not take advantage of limited liability and prefer to pledge private assets as a collateral to overcome financing problems. We thus assume that β and, thus, the private valuation in excess of liquidation values is small relative to the excess return of constrained firms,

$$(1-t_j)\,\rho_j > (1-p)\,\beta\Gamma_j, \tag{A}$$

leading to $H_c = H$ in (12). This case emphasizes the 'access to capital' argument in favor of incorporation. It also allows us to consider the implications of higher valuation of private assets H (e.g., through a housing price boom) for investment and the choice of organizational form, without this being an obvious advantage for non-corporate firms.

The following subsection discusses the implications of institutional reform towards better accounting and reporting regulations, leading to $d\Gamma_c < 0$, and of an increase in collateral value, $dH > 0$. We also calculate the excess burden of taxes. Subsection 3.2 turns to tax reform. In all scenarios, we start out with equal tax rates $t_n = t_c = t_k$. Hence, a firm's surplus differs across types of organizational form by $\pi_c - \pi_n = (1-t)\left(\pi_c^T - \pi_n^T\right)$. The discrete choice condition (5) reduces to $(1-t)\left(\pi_c^T - \pi_n^T\right) q = (1-t)\,k$, implying $\pi_c^T - k > q\pi_c^T - k = q\pi_n^T > 0$ as a useful restriction in the following analysis.

3.1 Investment, Profits and Welfare

The intensive investment response was discussed in equation (11) of subsection 2.2. Using semi-elasticities $\varepsilon_{t,j} \equiv \frac{\pi_j^T}{m_j I_j}$, $\varepsilon_{H,j} \equiv \frac{1-(1-p)\beta}{m_j I_j}$, $\varepsilon_{\Gamma,c} \equiv \frac{1}{m_c}$ and $\varepsilon_{k,c} \equiv \frac{k}{m_c I_c}$, all defined positive, investments of corporate and non-corporate firms react according to

$$\begin{aligned} dI_c &= -\varepsilon_{t,c} I_c \cdot dt_c + \varepsilon_{k,c} I_c \cdot dt_k - \varepsilon_{\Gamma,c} I_c \cdot d\Gamma_c + \varepsilon_{H,c} I_c \cdot dH, \\ dI_n &= -\varepsilon_{t,n} I_n \cdot dt_n + \varepsilon_{H,n} I_n \cdot dH. \end{aligned} \tag{13}$$

Although we focus on the case of $dt_c = dt_k$, it is instructive to consider the separate effects of subsidizing early stage investment with the tax subsidy t_k and taxing ex post

profits at rate t_c. Note first that subsidizing a fixed cost is akin to providing a lump-sum subsidy to the firm which could not affect investment in the traditional user cost theory of investment. In contrast, when firms are constrained, investment is sensitive to cash-flow. Since the subsidy boosts cash-flow, it also raises expansion investment. A tax on ex post profits drains cash-flow and reduces investment. The net effect of raising the corporate tax rate with full deductibility of upfront investment is negative, $dI_c = -\left(\varepsilon_{t,c} - \varepsilon_{k,c}\right) I_c \cdot dt_c = -\frac{\pi_c^T - k}{m_c} \cdot dt_c < 0$. Furthermore, higher collateral value facilitates investment by relaxing the financing constraint. Better institutions ($d\Gamma_c < 0$) similarly improve access to capital and boost investment of corporate firms which flows from the assumption that an improvement of book keeping and reporting standards effectively benefits corporate firms only.

The response of the incorporation rate depends on how shocks affect the surplus of firms with alternative legal status. The mechanical and behavioral effects on the surplus per firm in (4) are $d\pi_j = -\pi_j^T \cdot dt_j + (1-t)\,\rho_j \cdot dI_j - (1-p)\,\beta \cdot dH$. Note that the envelope theorem no longer applies. When firms are constrained, investment yields an excess return. Larger investment thereby boosts profits. Substituting (13) yields

$$\begin{aligned} d\pi_c &= -\left[\pi_c^T + \pi_c \rho_c / m_c\right] \cdot dt_c + \varphi_c \cdot dH + (1-t)\left(\rho_c / m_c\right)\left[k \cdot dt_k - I_c \cdot d\Gamma_c\right], \quad (14) \\ d\pi_n &= -\left[\pi_n^T + \pi_n \rho_n / m_n\right] \cdot dt_n + \varphi_n \cdot dH. \end{aligned}$$

We have assumed that the collateral value of pledging one's private asset boosts investment and the firm's surplus by more than the potential deadweight loss of liquidating the asset in case of failure. Hence, $\varphi_j \equiv (1-t)\,\rho_j \frac{1-(1-p)\beta}{m_j} - (1-p)\,\beta = \frac{(1-t)\rho_j - (1-p)\beta\Gamma_j}{m_j} > 0$ by (A), so that a higher price of private assets boosts the surplus of firms.

The change in the cut-off value of the pivotal firm that is indifferent in the incorporation decision, follows from the differential of (5), $(\pi_c - \pi_n)\,dq + q\left(d\pi_c - d\pi_n\right) = -k dt_k$. Upon substituting (14) and using m_j to eliminate Γ_j in deriving the coefficient of dH, the share of non-corporate firms changes by $dn = g\left(q\right) \cdot dq$,

$$dn = \eta_c \cdot dt_c - \eta_k \cdot dt_k - \eta_n \cdot dt_n + \eta_\Gamma \cdot d\Gamma_c + \eta_H \cdot dH, \quad (15)$$

where coefficients are

$$\begin{aligned}
\eta_c &\equiv \frac{\pi_c^T + \rho_c \pi_c / m_c}{\pi_c - \pi_n} g(q)\, q, \quad \eta_n \equiv \frac{\pi_n^T + \rho_n \pi_n / m_n}{\pi_c - \pi_n} g(q)\, q, \\
\eta_k &\equiv \frac{1 + q(1-t)\,\rho_c / m_c}{\pi_c - \pi_n} k g(q), \quad \eta_\Gamma \equiv \frac{(1-t)\,\rho_c / m_c}{\pi_c - \pi_n} I_c g(q)\, q, \\
\eta_H &\equiv (1-t)\left[\frac{\rho_n}{m_n} - \frac{\rho_c}{m_c}\right] \frac{1 - (1-p)\,\beta}{\pi_c - \pi_n} g(q)\, q.
\end{aligned}$$

The coefficient η_H is positive if incorporation is effective in relaxing the financing constraint, enabling corporate firms to invest at a larger scale which drives down the excess return ρ_c. Parameter Γ_c can be chosen small so that the intersection point in Figure 1 yields $I_c < I^{FB}$, but is relatively close to the unconstrained level, $I \to I^{FB}$ and $\rho_c \to 0$, so that $\rho_n / m_n > \rho_c / m_c$.

Raising the personal relative to the corporate tax rate clearly induces more firms to incorporate since it reduces surplus under non-corporate status. The net effect of a higher corporate tax rate $dt_c = dt_k$ is positive, $dn/dt_c = \frac{\left[q\pi_c^T - k\right] + (1-t)\left[\pi_c^T - k\right] q \rho_c / m_c}{\pi_c - \pi_n} g(q) > 0$, since both square brackets in the numerator are positive. Better reporting and book keeping regulations benefit corporations only and raise the incorporation rate, $dn < 0$. Finally, if incorporation is effective in raising investment and reducing ρ_c, as argued above for $\eta_H > 0$, a higher collateral value benefits non-corporate firms relatively more. They are more constrained and earn a higher excess return so that additional investment induced by higher collateral value generates a larger gain in surplus. In consequence, more firms choose to remain unincorporated.

Taking the differential of (6) shows how the effect on the incorporation rate changes the composition of mature firms in the expansion state,

$$ds_n = -ds_c = q \cdot dn. \tag{16}$$

Calculating the excess burden requires the change in tax revenue. To this end, we define an effective incorporation tax, $\tau_n \equiv \left(t_c \pi_c^T - t_n \pi_n^T\right) q - t_k k$, which collects the fiscal impact in (7) when more firms switch to corporate status, $dz = -\tau_n \cdot dn$. When tax rates

are uniform, the incorporation decision satisfies $(1-t)\left[\left(\pi_c^T - \pi_n^T\right) q - k\right] = 0$, which reduces the effective tax to zero, $\tau_n = 0$, and has no impact on revenue in our scenarios. Separating mechanical and behavioral effects yields

$$\begin{aligned} dz &= s_n \pi_n^T \cdot dt_n + s_c \pi_c^T \cdot dt_c - (1-n)\, k \cdot dt_k + \textstyle\sum_j t_j \rho_j s_j \cdot dI_j, \\ &= \textstyle\sum_j \left[s_j \pi_j^T - t_j \rho_j \varepsilon_{t,j} s_j I_j\right] \cdot dt_j - \left[(1-n)\, k - t_c \rho_c \varepsilon_{k,c} s_c I_c\right] \cdot dt_k \\ &\quad - t_c \rho_c \varepsilon_{\Gamma,c} s_c I_c \cdot d\Gamma_c + \textstyle\sum_j t_j \rho_j \varepsilon_{H,j} s_j I_j \cdot dH. \end{aligned} \tag{17}$$

The second and third lines result when substituting the behavioral response.

Differentiating the welfare measure (8) yields a term $\left[(\pi_c - \pi_n)\, q - (1-t_k)\, k\right] \cdot dn = 0$, due to organizational choice, leaving $dW = \sum_j s_j \cdot d\pi_j + (1-n)\, k \cdot dt_k + dH + dz$. Substitute the change in the surplus prior to (14) and the investment response in (13). Collecting terms yields a welfare change equal to

$$\begin{aligned} dW &= dz - \textstyle\sum_j \left[s_j \pi_j^T + (1-t)\, \rho_j \varepsilon_{t,j} s_j I_j\right] \cdot dt_j \\ &\quad + \left[(1-n)\, k + (1-t)\, \rho_c \varepsilon_{k,c} s_c I_c\right] \cdot dt_k - (1-t)\, \rho_c \varepsilon_{\Gamma,c} s_c I_c \cdot d\Gamma_c \\ &\quad + \left[1 - (1-p)\, \beta \textstyle\sum_j s_j + (1-t) \sum_j \rho_j \varepsilon_{H,j} s_j I_j\right] \cdot dH. \end{aligned} \tag{18}$$

This expression will be useful to analyze revenue neutral policy changes in the next subsection. To calculate the excess burden, one must substitute the change in tax revenue. Canceling tax and other terms results in

$$\begin{aligned} dW &= -\textstyle\sum_j \rho_j \varepsilon_{t,j} s_j I_j \cdot dt_j + \rho_c \varepsilon_{k,c} s_c I_c \cdot dt_k - \rho_c \varepsilon_{\Gamma,c} s_c I_c \cdot d\Gamma_c \\ &\quad + \left[1 - (1-p)\, \beta \textstyle\sum_j s_j + \sum_j \rho_j \varepsilon_{H,j} s_j I_j\right] \cdot dH. \end{aligned} \tag{19}$$

There are first-order welfare changes on the intensive margin, proportional to the excess return ρ_j on investment of constrained firms. Initially, there is no tax distortion on the extensive margin even with positive tax rates. Since tax rates are assumed all to be equal in the initial equilibrium, the tax wedge on the discrete choice τ_n is zero.[15]

[15] However, raising the corporate tax rate to a level of $t_c = t_k > t_n$ leads to a positive effective tax, $\tau_n > 0$. In the new equilibrium, the discrete choice condition is $(1-t_c)\left(q\pi_c^T - k\right) = (1-t_n)\, q\pi_n^T$. Hence, $t_c > t_n$ implies $q\pi_c^T - k > q\pi_n^T$, so that the tax wedge $\tau_n = t_c\left(q\pi_c^T - k\right) - t_n q\pi_n^T$ becomes positive. Starting from this situation, further tax reform would distort the incorporation margin as well.

A higher collateral value boosts welfare since $1 > (1-p)\,\beta$ implies $1 > (1-p)\,\beta \sum_j s_j$, a fortiori. Better institutions (lower Γ_c) raise welfare as well. An increase in the corporate tax rate $t_c = t_k$ reduces welfare by taxing ex post profits at rate t_c and reducing pledgeable cash-flow which further constrains investment. In contrast, the tax credit t_k on the fixed cost strengthens own funds and boosts investment and welfare. Using the investment elasticities yields a negative net effect $dW = -\left(\pi_c^T - k\right) s_c \rho_c / m_c \cdot dt_c < 0$. We can thus summarize these results as follows.

Proposition 5 ***(Corporate Tax)*** *Starting with uniform tax rates, a differential increase in the corporate tax reduces investment and profits of corporate firms, discourages incorporation and imposes a first-order welfare loss.*

For a proof, see the results discussed in equations (13)-(15) and (19). Trivially, raising the tax on sole proprietorships similarly impairs investment and profits of these firms and reduces welfare, but obviously encourages more incorporation. Such a tax on non-corporate profits probably leads to an even larger first-order welfare loss than the one on corporate firms, since non-corporate firms are more heavily constrained in their investment scale and earn a larger excess return.

The link between a firm's legal form and its tax status may not be as tight as suggested in Proposition 5. In the U.S., non-corporate firms can 'check the box' and pay taxes under the corporate schedule. Similarly, corporate firms can shift from C-corporate status to subchapter-S corporate status and pay taxes at the personal level. Given a 'check the box' provision, one would expect that firms choose the most tax efficient schedule independent of their choice of legal form. In our framework, this would be the lower of the two tax rates, applying to both legal forms. Consider a uniform increase in tax rates to $t_j + dt$ and $t_k + dt$, with tax revenue rebated lump-sum as before. Starting from symmetry, $t_j = t_k = t$, the tax treatment is apparently non-discriminatory, prior and after the policy change. The higher tax rate reduces investment and profit of both types of firms, see (13)-(14), as we have shown for the corporate tax before. The welfare loss observed for

corporate firms extends to non-corporate firms as well, see (19), and reflects the fact that investment of all firms is constrained and further reduced by the tax. Does it distort organizational choice? Evaluating (15) and noting $\left(\pi_c^T - \pi_n^T\right) q = k$ with fully symmetric tax treatment yields

$$\frac{dn}{dt} = \eta_c - \eta_k - \eta_n = -\frac{\left(\rho_n/m_n\right)\pi_n - \left(\rho_c/m_c\right)\left(\pi_c - (1-t)\,k\right)}{\pi_c - \pi_n} g\left(q\right) q. \tag{20}$$

If incorporation is effective in facilitating external funding, it also drives down the excess return on corporate investment. If this effect is sufficiently strong ($\rho_c \to 0$), a symmetric increase in tax rates favors incorporation. Hence, in our framework, a 'check-the-box' provision fails to achieve neutrality towards choice of organizational form. The intuition is that lower investment strictly reduces profit of constrained firms, the effect being proportional to the excess return. While the direct effect of the tax increase on organizational choice cancels out, the investment response changes relative profits. Corporate firms are less constrained with a small excess return so that a cut in investment has little impact on profits. Non-corporate firms have a high excess return so that lower tax induced investment substantially cuts profits. Hence, incorporation becomes more attractive in a high tax world. The upshot is that an apparently symmetric tax treatment is not neutral when firms are heterogeneous in their financial regime.

Proposition 6 ***(Check the Box)*** *Starting with uniform tax rates, a symmetric increase in all tax rates reduces investment and profits of both types of firms and is strictly welfare reducing. The tax increase favors incorporation if corporate firms with better access to capital are relatively less constrained.*

Largely the same intuition applies to the effects of an increase in collateral value in a scenario where both types of firms prefer to pledge private assets. The benefits are relatively larger for non-corporate firms when the conditions for a positive coefficient η_H as discussed in (15) are fulfilled.

Proposition 7 ***(Collateral Value)*** *Given (A), an increase in the value of private assets H boosts investments and profits of both types of firms and raises welfare. If non-corporate*

firms are relatively more constrained such that $\rho_n/m_n > \rho_c/m_c$, a higher collateral value benefits them relatively more and discourages incorporation.

Turning to institutional reform, we observe that better book keeping and reporting regulations selectively favor corporate firms. Such institutional and regulatory reform relaxes financing constraints and allows corporate firms to implement unexploited investment opportunities with an above-average return so that welfare rises.

Proposition 8 ***(Institutional Quality)*** *In countries with better accounting and reporting standards (i.e., lower Γ_c), corporate firms invest at a larger scale, earn higher profits and have a lower excess return relative to non-corporate firms. The rate of incorporation and welfare are higher in these countries.*

3.2 Revenue-Neutral Reform

With regard to the choice of legal forms, much of the tax reform debate postulates neutrality in the sense that incorporated and unincorporated firms should be treated equally from a tax perspective.[16] In this section, we argue that it might be welfare enhancing to deviate from uniform taxation. The intuition is already evident in the discussion of Propositions 5 and 6. Since incorporation relaxes a financing constraint and facilitates access to external capital, corporations end up being less constrained compared to non-corporate firms. With investment being closer to the first-best, raising tax from corporations is less damaging than levying the same tax on non-corporate firms.

To show this, consider the following revenue-neutral policy change: starting with positive, but uniform rates, we raise the corporate tax rate $t_c = t_k$ and cut the personal

[16] For instance, the proposals of the Meade Committee (1978: 227) aimed at eliminating the differential taxation of both firm types. See also the U.S. blueprints for basic tax reform (Department of Treasury 1977: 68). The Mirrlees report (Mirrlees et al., 2011) and the background chapter by Crawford and Freedman (2010) provide a comprehensive discussion on this issue.

income tax rate on non-corporate firms to an extent that keeps tax revenue constant. As in the previous subsection, the effective tax τ_n is zero prior to the policy change. Evaluating (17) and substituting ε-coefficients links the changes in tax rates by

$$\left[1 - t\rho_n/m_n\right] s_n \pi_n^T \cdot dt_n = -\left[s_c \pi_c^T - (1-n)\, k - t\frac{\rho_c}{m_c}\left(\pi_c^T - k\right) s_c\right] \cdot dt_c. \tag{21}$$

Evaluate the welfare change in (18) with $dz = 0$, substitute ε-coefficients and use (21) to cancel some terms which leaves

$$dW = -\frac{\rho_n}{m_n} s_n \pi_n^T \cdot dt_n - \frac{\rho_c}{m_c}\left(\pi_c^T - k\right) s_c \cdot dt_c. \tag{22}$$

Substituting the revenue-neutral cut in the personal income tax from (21) yields

$$\frac{dW}{dt_c} = \frac{s_c \pi_c^T - (1-n)\, k}{1 - t\rho_n/m_n}\left[\frac{\rho_n}{m_n} - \frac{\rho_c}{m_c} \cdot \frac{s_c \pi_c^T - s_c k}{s_c \pi_c^T - (1-n)\, k}\right]. \tag{23}$$

Note that $\pi_c^T - k > 0$, as argued in the introduction of Section 3. Using the definition of s_c, we have $s_c > (1-n)\, q$,[17] implying $\left[s_c \pi_c^T - (1-n)\, k\right] > (1-n)\left(q\pi_c^T - k\right) > 0$. Since $s_c < 1 - n$, the factor multiplying with ρ_c/m_c in the square bracket is larger than unity. The condition for the square bracket to be positive is now slightly stronger than the one noted in equation (15). But in the same vein, if incorporation is sufficiently effective in relaxing the firm's finance constraint, it drives the excess return of corporate firms close to zero, $\rho_c \to 0$, leading to a welfare gain in (23).

Proposition 9 ***(Tax Discrimination)*** *If incorporation is sufficiently effective in relaxing the finance constraint, an increase in the corporate tax and a revenue-neutral cut in the tax on non-corporate firms increases welfare.*

The corporate legal form creates access to external capital. As a result, corporate firms are less constrained and are able to invest close to the efficient scale. In other words, the under-investment resulting from a financing constraint is more severe with non-corporate firms. A tax on these firms imposes a larger welfare cost than a tax on

[17] Write $s_c = \int_q^1 q' dG\left(q'\right) > q \cdot \int_q^1 dG\left(q'\right) = q \cdot (1-n)$.

less constrained, corporate firms. Hence, shifting the tax burden from non-corporate to corporate firms raises welfare. This result reminds of an old argument that suggests a differential corporate tax as a 'fee' for the advantages of the corporate legal form, resulting in some double taxation of corporate profits as under a classical system.[18]

4 Conclusions

This paper provided a microfounded theory of taxes and firms' incorporation decision. We have analyzed a model where firms decide whether to adopt a corporate or non-corporate legal form. In particular, we have studied two main arguments in favor of incorporation that are often informally recognized in the literature: limited liability and access to capital. We have derived these arguments in an agency model where firm transparency constrains managerial opportunism and thereby facilitates externally financed investment. We have found that better access to external capital is an important benefit of the corporate form when firms are finance constrained, while the effect of limited liability on the incorporation decision is generally ambiguous.

Regarding policy implications, we found that a higher differential corporate tax discourages incorporation, as in standard empirical analysis. More novel results are that taxation of constrained firms is costly and imposes first-order welfare losses. Taxes are more damaging to firms that are more constrained. Since the corporate status facilitates access to capital, corporate firms are less constrained and their excess return on investment is smaller. We therefore found that partly shifting the tax burden from non-corporate to corporate firms is welfare improving, if incorporation is effective in creating access to the capital market. For the same reason, apparently neutral tax schemes with a 'check-the-box' provision, where firms are essentially free to opt for the more tax efficient status independent of legal form, are not neutral with respect to the choice of legal form when

[18] However, other policy considerations such as international tax competition might render a high corporate tax unattractive.

firms are in a very different financial regime. We have also shown that institutional reform towards better accounting and reporting standards or higher collateral value should help to relax finance constraints and yield important welfare gains.

Appendix

This Appendix verifies the claim stated in footnote 12 which refers to (10).An alternative and economically equivalent formulation of the financing constraint relates to insiders' diversion of company resources (e.g. Ellul, Pagano and Panunzi, 2010). Suppose that the owner manager can divert a part γ_j of business assets for private use.[19] The divertible share is lower under the corporate legal form which requires tighter documentation. Consider (3) and denote the entrepreneur's income in the good state by $v_j^e \equiv I_j + f(I_j) - T_j - (1+i) D_j - L_j$. Misusing resources reduces the company's earnings by $\gamma_j I_j$ in the good state. Diversion occurs if the private benefits of doing so exceed the contractually assigned income share that the owner could earn when fully repaying external funds, i.e., $\gamma_j I_j > v_j^e$. The possibility of diversion reduces the firm's pledgeable income and restricts external funding. The financing constraint becomes $v_j^e \geqslant \gamma_j I_j$. Multiplying by p, substituting the definition above as well as T_j and D_j from the main text, using the no-arbitrage condition $p(1+i) = 1$, subtracting $(1-p)\beta H_j$ from both sides and rearranging yields

$$\pi_j = p(1-t_j)(f(I_j) - iI_j) - (1-p)\beta H_j \geqslant \Gamma_j I_j - E_j - (1-p) H_j, \quad \Gamma_j \equiv p\gamma_j. \quad (10')$$

The financing constraint is structurally identical to (10) and is illustrated in Figure 1. Noting the different scaling of H_j on the right side, one can redefine the coefficient Γ_j to yield exactly the same solution for I_j. Furthermore, one must slightly reformulate the condition relating to the use of limited liability in Proposition 3. Given the investment

[19] Ellul, Pagano and Panunzi (2010) assume that a share of gross output may be diverted, corresponding to $I_j + f(I_j)$. The present assumption of diversion of assets I_j is qualitatively in the same vein, but keeps the greatest analytical similarity with the model in the main text.

response deriving from the differential of (10'), $dI_j/dH_j = (1-p)(1-\beta)/m_j$, the change in the firm's surplus is (12') in place of (12) and leads to the result in Proposition 3:

$$\frac{d\pi_c}{dH_c} = (1-p)\frac{(1-t_c)\rho_c - \beta\Gamma_c}{m_c}. \tag{12'}$$

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